

2014

Interprofessional Education on Oral Care for Cancer Patients in Dental Hygiene and Nursing

Shaun Christenson

Eastern Washington University

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Interprofessional Education on Oral Care for Cancer Patients
in Dental Hygiene and Nursing

A Thesis

Presented in Partial Fulfillment of the Requirements for the
Degree of Masters of Science

in

Dental Hygiene

in the

College of Graduate Studies

Eastern Washington University

by

Shaun Christenson

Summer 2014

Major Professor: Ann O'Kelley Wetmore, RDH, BSDH, MSDH

IPE ORAL CARE FOR CANCER PATIENTS

THESIS OF SHAUN CHRISTENSON APPROVED BY

ANN O'KELLEY WETMORE, RDH, MSDH
GRADUATE STUDY COMMITTEE

DATE_____

REBECCA STOLBERG, RDH, MSDH
GRADUATE STUDY COMMITTEE

DATE_____

BARBARA ANNE RICHARDSON, RN, PhD
GRADUATE STUDY COMMITTEE

DATE_____

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MASTER'S THESIS

In presenting this thesis in partial fulfillment of the requirements for a master's degree at Eastern Washington University, I agree that the JFK Library shall make copies freely available for inspection. I further agree that copying of this project in whole or in part is allowable only for scholarly purposes. It is understood, however, that any copying or publication of this thesis for commercial purposes, or for financial gain, shall not be allowed without my written permission.

Signature_____

Date_____

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Human Subjects Approvals

Institutional Review Board
for Human Subjects Research

Application for Exemption

Return original and two copies to: Grants Office, 210 Showalter

Principal Investigator/Title/Department/Address/Phone/email Shaun Christenson, RDH, BSDH Graduate Student Dental Hygiene Department 519 NW 209 th Street Ridgefield, WA 98642 360-609-0243 Schristenson2010@eesles.ewu.edu	Responsible Project Investigator/Department/Phone/email (faculty or staff supervisor required if PI is a student) Ann O'Kelley Wetmore, RDH, MSDH Assistant Professor EWU Dental Hygiene Department 301 N Riverpoint Box E Spokane, WA 99202 509-828-1321 awetmore@ewu.edu
Title of Project Interprofessional Education and Collaboration in Dental Hygiene and Nursing	
For students only: Is this research being done to meet a course, thesis or other academic requirement? (please specify) If not, why is it being done? Yes, this research is for thesis credit completion for DNHV600.	
Project anticipated starting date: April 21, 2014 Anticipated termination date: April 21, 2015	
Funding: <u>Non-funded</u> <u>X</u> <u>Internal funding</u> <u>N/A</u> <u>External funding</u> <u>N/A</u> Funding status: <u>proposal in preparation</u> <u>N/A</u> <u>pending agency decision</u> <u>N/A</u> <u>funded</u> <u>N/A</u> Funding Agency (if applicable): <u>N/A</u>	
Check the type of exemption applicable to the project 1. <u>2</u> <u>X</u> <u>3</u> <u>4</u> <u>5</u> <u>6</u> <u>None</u> Why should this project be considered exempt? This study will use Survey Monkey to administer anonymous survey. Surveys could be considered for IRB Exempt status because they do not disrupt or manipulate subjects' normal life experiences and will not incorporate any form of intrusive procedures.	
Please state the purpose and methodology of the research: This study will use a quasi-experimental design with a convenience sample of allied health students' surveyed before and after an interprofessional learning experience. Teams of nursing and first and second year dental hygiene students will be organized into small homogenous groups of seven or eight nine members and provided a case study educational module for treating cancer patients. The module will use a problem based case study that will include decision making, critical thinking, and reflective learning experiences. Each IPE team will develop treatment options and determine best practice on how to provide comprehensive patient-centered care. Interprofessional Education Collaborative (IPEC) core competencies will be incorporated within the training, student lesson plan, and assessment tools. The competency domains that will be focused on include Roles/Responsibilities for Collaborative Practice and Interprofessional Communication (IPEC, 2011). The study will seek to determine if the implementation of an IPE module on oral care for the cancer patient (1) improves students' knowledge of oral care for the cancer patient, (2) improves student's communication skills and perception of their own role on a cancer care team, and (3) helps students develop an understanding of how IPE can enhance collaborative patient-centered care? All students will complete a demographic survey. See Attachment A. Prior to and upon completion of module, students will complete a pre and post survey using the Readiness for Interprofessional Learning Scale (RIPLS) to determine student's level of understanding for teamwork and collaboration, negative and positive professional identity, and roles and responsibilities (NEUSIPE). In addition to the RIPLS survey an additional PI-designed Module Likert-type survey will be included to determine module learning outcomes. See Attachment B.	
Describe the procedures: what specifically will subjects do? If data are anonymous, describe the data gathering procedure for insuring anonymity. Because the PI is a graduate student at Eastern Washington University (EWU), the Institutional Review Board (IRB) for Eastern Washington University (EWU) must be informed of this study. The PI has submitted an IRB proposal to Mt Hood Community College IRB because the subjects will be MHCC students.	

rev. 5/31/06

IPE ORAL CARE FOR CANCER PATIENTS

The PI is an adjunct professor in the Dental Hygiene Program at Mount Hood Community College (MHCC), and has access to allied health students. Therefore, a convenience sample will be obtained by enlisting volunteer nursing and dental hygiene students enrolled in their respective programs at MHCC.

Stage 1 Communicate with Faculty. The PI will communicate with MHCC dental hygiene and nursing faculty to set up a meeting with dental hygiene and nursing students to introduce the study and obtain consent for their voluntary participation. The Mount Hood Community College nursing and dental hygiene programs require a community service component to their program. Participation in this study will help students meet their respective programs requirements. The PI will ask permission to use an email distribution list of all dental hygiene and nursing students from each respective program. The PI will then arrange a classroom for this meeting and email all potential student participants using student email lists and the blind carbon copy (bcc) feature for sending email in order to maintain email privacy.

5. INFORMED CONSENT PROCESS:

Stage 2 Study Informational Meeting. At the arranged meeting time and place the PI will present a short PowerPoint® presentation on the proposed study to all students attending. In addition, the PI will provide a letter to each student explaining the study, their role, and the PI's credentials. This letter from the PI will inform them of their voluntary status, the benefits of participating in the study including documentation of research participation on their professional resumes.

The PI will assure them there will be no negative effects if they choose not to participate. The PI will advise all students of how study results will be published and data collected to assure confidentiality. In addition, the PI will provide contact information to the students for herself, her thesis advisor, and the EWU IRB. Subsequently, they will be provided an opportunity to ask questions of and have them answered by the PI.

Students will then be asked to read and sign a consent form giving permission for study enrollment which includes participation in a module on oral health for cancer patients and collection of pre and post survey scores. Each student enrollee will receive a copy of the signed consent form for their personal records.

The PI will inform students of the prearranged time for the module implementation. Each student will receive a snack at the completion of the informational meeting. All student data will be kept confidential in a locked drawer at the PI's personal residence.

PROCEDURES: The PI is cognizant of the importance of time for both students as well as faculty and will try to adhere to the proposed times for each stage of study implementation.

Stage 3 Module Preparation. Prior to module implementation the PI will send email reminders to students and faculty. In an attempt to enroll all students the PI will be available to any students who missed the information meeting to explain the study and obtain consent following the same protocol as described in Stage 2. The PI will verify classroom availability and equipment systems.

In an attempt to determine learning outcomes, students will be placed into homogenous allied health teams. These groups will consist of two first year students and two second year students from the dental hygiene program and four to five senior nursing students from the nursing program which will result in six groups of seven ($n=7$) and three groups of eight students ($n=8$). The PI will use class lists from nursing and dental hygiene and cross reference with subject's signed consent forms to assure subject consent. All enrolled subjects will be sorted into first year dental hygiene, second year dental hygiene, senior nursing, and junior nursing respectively. The PI will then randomly draw two first year dental hygiene students and two second year dental hygiene students and three or four nursing students for Group A and continue this process until all subjects are assigned to a team.

Each team will have a colored name tag and each student's name tag which corresponds with their team will be in a manila envelope they will receive at module implementation. The PI will review the Oral Cancer Care module and do a run through to assure a timely implementation and evidence-based content. Depending on the agreed upon time for module implementation the PI will arrange for snacks for all participants.

Stage 4 Student Orientation. On the arranged date for the module implementation the PI will present a short 5 minute PowerPoint® presentation outlining the study events including pretest, module implementation, case study small group work, and posttest. Students will have an opportunity to clarify any concerns they have regarding the module implementation. Students will be briefed on the problem based case study enhanced with a modified simulated experience which will be aligned with a real life situation.

Stage 5 Module Pre-test. The PI will gather demographic data and administer the pre-test RIPLS and PI-designed multiple choice survey via Survey Monkey. The PI anticipates this stage to take 5-10 minutes.

Stage 6 Presentation of Module Content. Upon collection of all pretest surveys, the PI will present the module content to the students. Topics on oral cancer care will include: prevalence of cancer, oral complications that may occur with cancer care, implications of cancer treatment stops, and overview of potential oral complication treatments. The module presentation will take about 25 minutes.

Stage 7 Case Study. After the PI presents the module content and answers any questions, the

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The information provided above is accurate and the project will be conducted in accordance with applicable Federal, State and University regulations and ethical standards.

Signature, Principal Investigator(s) Shawn Christensen Date 4-7-14

Recommendations and Action

Date

Approve/Disapprove

Faculty Sponsor (for student) Ann O'Keller Kermar 4-7-2014 approve

Dept IRB Representative or Dept Chair Rebecca D. Lyle 4-8-14 approve

Institutional Review Board

Conditions: _____ Approved from _____ To _____

Exemption Decision Aid

Research Qualifying for Exemption from Federal Regulations for the Protection of Human Subjects
(Quoted from the Code of Federal Regulations, Title 45, Part 46.101(b)(1-6))

- (1). Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or on the comparison among instructional techniques, curricula, or classroom management methods.
- (2). Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior, unless: (i) information obtained is recorded in such a manner that the human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.
- (3). Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) requires without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
- (4). Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.
- (5). Research and demonstration projects which are conducted by or subject to the approval of the department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.
- (6). Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level of and for a use found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

Based on both federal policy and/or University policy, exempt status may not be granted for research in the preceding six categories if any of the following conditions applies (except for certain exemptions for children):

- | Yes | No |
|--------------------------|---|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If any of the subjects are confined in a correctional or detention facility. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If pregnancy is a prerequisite for serving as a subject. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If fetuses <i>in utero</i> are subjects in this research. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If any subjects are presumed not to be legally competent. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If personal records (medical, academic, etc.) are used without written consent. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If data from subjects (responses, information, specimens, etc.) are directly or indirectly identifiable. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If data are damaging to subjects' financial standing, employability or reputation |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If material obtained at autopsy is to be used in the research. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If subjects are to be asked sensitive questions about personal feelings, behavior, interactions, or sexual experiences. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If alcohol or any other drugs will be ingested. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If blood or body fluids will be drawn. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If any of the subjects are children as defined by state law.* |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> Will the child participate in a survey? |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> Will the child be interviewed? |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> Will the investigator manipulate the environment or interact with the child as part of the data gathering? |

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For Office Use Only: <u>4/21/14</u>	IRB Case No: _____
Date Reviewed: _____	IRB Reviewer: <u>C. Plu</u>
Action: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Exempt <input type="checkbox"/> Not Approved	

**Mt. Hood Community College
INSTITUTIONAL REVIEW BOARD (IRB)
APPLICATION FOR THE CONDUCT OF RESEARCH
INVOLVING HUMAN SUBJECTS**

The Mt. Hood Community College IRB reviews all requests to conduct research involving human subjects. It is the Investigator's responsibility to give complete information regarding procedures and the informed consent process. If the principal investigator is a student, the application must be approved and signed by the applicant's faculty sponsor and the Dean of the faculty's division.

After completing the application and obtaining required signatures, one original of the application and all supporting materials must be forwarded to the **MHCC IRB, Office of Instruction and Student Services, 26000 SE Stark Street, Gresham, Oregon 97030**. The IRB will notify each applicant of the IRB's decision. If you have questions, please contact the IRB at 503-491-7295.

The Principal Investigator must supply the required documentation listed below:

- ☒ A copy of all questionnaires or survey instruments
- ☒ Informed consent document(s) or minor assent document(s)
- ☒ Letters of approval from cooperating institutions (if appropriate)
- ☒ All required signatures

Please type or print responses.

PROJECT TITLE: Interprofessional Education and Collaboration in Dental Hygiene and Nursing

1. Principal Investigator's Name Shaun Christenson

(If more than one principal investigator, provide supplementary page with contact information.)

Department Dental Hygiene Phone 360-609-0243

Mailing Address 519 NW 209th Street, Ridgefield, WA 98642

Email Schristenson2010@eagles.ewu.edu

Faculty Sponsor Ann O'Kelley Wetmore Phone 509-828-1321

Department/Institution Eastern Washington University Dental Hygiene

Email awetmore@ewu.edu

Is this a class project? yes ☒ no ☐ Thesis? yes ☒ no ☐ Other _____

2. Project Start Date: April 21, 2014 Project End Date: April 21, 2015

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3. Is a proposal for external support being submitted? yes no ☒

Agency or Sponsor: _____ Deadline: _____

If yes, you must submit one complete copy of the proposal with this application.

a. Is this a continuation of a MHCC IRB project? yes ☐ no ☒

If yes, previous IRB case number: _____

4. PROJECT DESCRIPTION: This study will use a quasi-experimental design with a convenience sample of allied health students' surveyed before and after an interprofessional learning experience. Teams of nursing and first and second year dental hygiene students will be organized into small homogenous groups of seven or eight nine members and provided a case study educational module for treating cancer patients. The module will use a problem based case study that will include decision making, critical thinking, and reflective learning experiences. Each IPE team will develop treatment options and determine best practice on how to provide comprehensive patient-centered care. Interprofessional Education Collaborative (IPEC) core competencies will be incorporated within the training, student lesson plan, and assessment tools. The competency domains that will be focused on include Roles/Responsibilities for Collaborative Practice and Interprofessional Communication (IPEC, 2011).

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5. SUBJECT SELECTION:

Will subjects be less than 18 years of age? Yes ☐ No ☒

Age range of subjects From 19 To 99

Will subjects be students at MHCC? Yes ☒ No ☐

How many subjects will participate? 50-80

How will subjects be selected, enlisted or recruited?

The PI is an adjunct professor in the Dental Hygiene Program at Mount Hood Community College (MHCC), and has access to allied health students. Therefore, a convenience sample will be obtained by enlisting volunteer nursing and dental hygiene students enrolled in their respective programs at MHCC.

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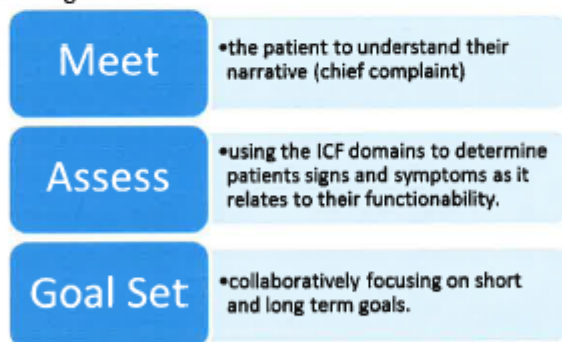
Each team will have a colored name tag and each student's name tag which corresponds with their team will be in a manila envelope they will receive at module implementation. The PI will review the Oral Cancer Care module and do a run through to assure a timely implementation and evidence-based content. Depending on the agreed upon time for module implementation the PI will arrange for snacks for all participants.

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Stage 7 Case Study. After the PI presents the module content and answers any questions, the participants will find their pre-assigned groups based on their name tag colors. The PI will provide basic training on how to use an IPE case-based teaching model referred to as the meet, assess, goal set, plan, implement, and evaluate model (MAGPIE). The MAGPIE model is an interdisciplinary case management process. The six stages of the model are defined in Figure 5.



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Figure 5 The MAGPIE process, a method for case based teaching and learning. (Cahill, O'Donnell, Warren, Taylor, & Gowan, 2013)

Each team will receive a template with the MAGPIE model to assist them in developing a patient care plan. They will be given 40 minutes to work collaboratively and formulate their plan. The PI will then lead a 5-10 minute debriefing session on the case study.

Stage 8 Post Test. After the module case study debriefing, the PI will administer the post-test RIPLS and PI-designed multiple choice survey via a second Survey Monkey link. Each student will receive a snack after completing their posttest surveys which should take about 5-7 minutes.

7. CONFIDENTIALITY AND ANONYMITY:

Survey Monkey respondent data will be anonymous and all data will be emailed to the PI in encrypted formats to the PI's password-protected account. Copies of student consent form and team paperwork will be kept at the PI's residence in a lock filing cabinet. All electronic study data will be kept in a password protected computer that is only accessed by the PI.

8. RISKS:

This study is minimal risk. There are no known or anticipated risks to subjects. Any potential risks from this study would not be any different from those risks encountered in daily life.

BENEFITS:

The anticipated benefit of this study is all participants will have the opportunity to participate in an IPE learning experience. Students who choose to participate in this study also have the opportunity to document research participation on their professional resumes. The anticipated benefit to society is the possibility of better patient care resulting from an understanding of the importance of collaboration in providing cancer care.

RESPONSIBILITIES OF THE PRINCIPAL INVESTIGATOR:

- Any additions or changes in procedures in the protocol will be submitted to the IRB for written approval prior to these changes being put into practice.
- Any problems connected with the use of human subjects once the project has begun, must be brought to the attention of the IRB.
- The principal investigator and his or her designee are responsible for retaining Informed Consent Documents for a period of three years after the completion of the project.

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The principal investigator may not initiate any research involving human subjects until written notification of IRB approval or compliance with any and all contingencies made in connection with said approval has been received. *Failure to provide all required information will result in return of your IRB application for correction prior to IRB review.*

SIGNATURES: *I certify to the best of my knowledge the information presented is an accurate reflection of the proposed research project and that I intend to comply with the guidelines set forth by MHCC Institutional Review Board's Conduct of Research Involving Human Subjects.*

A. Shawn Christensen 4-7-2014
Principal Investigator (required) Date

B. Approval by faculty sponsor (required for all students):

I confirm the accuracy of this application, and I accept responsibility for the conduct of this research, the supervision of human subjects, and maintenance of informed consent documentation as required by the IRB.

Ann O'Kelley Weber 4-7-2014
Faculty Sponsor Date

C. Approval by Vice President of Instruction and Student Services (required):

I approve of the procedures that involve human subjects.

Christie Blum 4/20/14
Vice President Date

IPE ORAL CARE FOR CANCER PATIENTS

Abstract

Purpose: Interprofessional education (IPE) provides academic experiences for students to learn about different professions, their roles, and improving attitudes toward communications between professions with the intent of improving patient overall healthcare. This study evaluated the impact of IPE and knowledge the students gained on oral healthcare for cancer patients.

Methods: This quasi-experimental study used a convenient sample of nursing and dental hygiene students. Participants were given a pre and post survey to collect quantitative data that included a Readiness for Interprofessional Survey (RIPLS) and a PI-designed multiple-choice survey to determine students' attitudes and learning. A module of IPE and oral cancer care was provided for the students. A case study was presented and students were allowed time to work in preselected mixed groups to design patient care addressing the multiple oral complication a cancer patient can experience. Anecdotal data was collected via student comments.

Results: Study results demonstrated an improvement in participant's knowledge of oral care for cancer patients' oral complications, attitudes towards interprofessional communications, and understanding of professional roles.

Conclusion: The implementation of an IPE experience demonstrated a correlation between an IPE experience and participant's attitudes and learning. Patients undergoing cancer treatment will experience some form of oral complications. Preparing students to meet the needs of the cancer patient's oral health will ultimately decrease oral complications and patient mortality.

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Acknowledgements

I wish to express sincere gratitude for consistent and strong direction provided by my thesis committee chairs. First and foremost I wish to acknowledge Professor Ann O’Kelley Wetmore, MSDH of Eastern Washington University. Professor Wetmore remained true and dedicated to my efforts as a student, providing positive and patient encouragement. Her insightful guidance, leadership, patronage, and understanding of my passion for my topic have provided remarkable support allowing for successful completion of my study. She is of whom I strive to emulate.

I would like to acknowledge my second committee chair Professor Rebecca Stolberg, MSDH. Professor Stolberg recognized my passion and supported me through the thesis process while I found my topic for my thesis research. I struggled to find a passion through my thesis venture and Professor Stolberg allowed me space to explore and find my center.

In addition, I would like to acknowledge my third committee chair Professor Barbara Anne Richardson. Doctor Richardson provided valuable topic understanding and a non-dental hygiene perspective allowing for increased clarity and understanding as it relates to writing and statistical understanding of interprofessional education within the dental hygiene and nursing profession. I am very grateful to Mount Hood Community College and the study participants who took time out of their busy schedule to support my research project.

Thank you to the entire Eastern Washington University and the Dental Hygiene Department for their commitment to excellence and pushing me to strive for the same in research and becoming a life-long learner and eventually a contributing member as an instructor.

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IPE ORAL CARE FOR CANCER PATIENTS

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Introduction/ Literature Review

Introduction to the Research Question

The World Health Organization (WHO), (2010) suggests there is a need to move from a traditional separation of allied health education to a collaborative academic instruction using Interprofessional Education (IPE) and collaboration theories. Providing academic IPE experiences with dental hygiene and nursing students may result in a stronger better prepared collaborative work force between the two professions. This proposed study examined an IPE experience in providing care for the cancer patient. An interprofessional team of nurses and dental hygiene professionals can work to reduce oral side effects of radiation and chemotherapy treatments in cancer patients. A collaborative effort in caring for cancer patients could reduce cost of care, oral complications, and decrease the incidence of cancer patients having to stop cancer treatment (Lambertz et al., 2010).

Unplanned breaks in cancer treatment lowers survival rates, increases cost of care, and decreases quality of life (Lambertz et al., 2010). Radiation and chemotherapy almost always results in some form of oral complication, especially during head and neck cancer treatment with mucositis affecting approximately 80% of cancer patients (Miller, Donald, & Hagemann, 2012). The most common oral complication is oral mucositis (Lambertz, et al., 2010). Mucositis is one of the side effects of cancer treatments that are most often overlooked until it adversely affects patient's quality of life (Miller et al., 2012). Common and frequent oral complication such as mucositis, oral infections, and bleeding

can be minimized and in some cases eliminated when identified at an early stage of occurrence (Chambers et al., 2009).

There is evidence that oral health has a bidirectional effect on total body health, (Chambers et al., 2009; Huskinson, L.W., 2009; Migliorati et al., 2013; Sussman, et al., 2013; Vargas & Arevalo, 2009). Dental hygienists are oral health specialists trained to address the soft tissue of the mouth. Their education includes understanding and treating a variety of oral complications patients may exhibit from diverse etiology (Manne, Giarelli, & Throckmorton, 2003). Prior to, during, and after cancer treatment patient's oral health status, risk factors, and ability to manage their own oral care can have an impact on their oral health during cancer treatment (Konradsen, Trosborg, Christensen, & Pedersen, 2012; Lambertz et al., 2010).

Oncology nurses play an integral role in managing patients' overall treatment but lack consistent specialized oral health training (Bell, Phillips, Paquette, Offenbacher, & Wilder, 2011; Huskinson, L.W., 2009; Manne et al., 2003). To address oral complications nurses have to undergo specialized instruction to manage the oral health needs of cancer patients (Bell et al., 2011; Manne et al., 2003; Sussman et al., 2011). Dental hygienists receive oral health training as part of their curriculum. Wardh et al., (2009) stated oral health is an important aspect of health care and is often a neglected area of nursing care receiving a low priority. From a holistic viewpoint, there is a great need for multidisciplinary collaboration between nursing and dentistry (Bainbridge et al., 2011; Manne et al., 2003; Sussman et al., 2011; Wardh et al., 2009).

Statement of the Problem

Literature demonstrates there are benefits to students, academic programs, and communities when IPE is used to prepare students for a collaborative workforce (Bleakley, Allard, & Hobbs, 2012; WHO, 2010). When healthcare workers learn to work with other professions, resources are better utilized and community populations are serviced more effectively (Bleakley, Allard, & Hobbs, 2012; WHO, 2010). It is clear that IPE can develop practice ready healthcare workers prepared to support patient care. Little is understood regarding the effectiveness of learning models and the learning outcomes of IPE with nursing and dental hygiene students treating cancer patients. This study will seek to answer the following research questions.

1. Does the implementation of an IPE module on oral care for the cancer patient improve dental hygiene and nursing students' knowledge of oral care for the cancer patient?
2. Can an IPE module on oral care for cancer patients improve dental hygiene and nursing student's communication skills and understanding of their roles as an oral health care provider by improving student's perception of their own role on a cancer care team?
3. Can an IPE module on oral care for cancer help students develop an understanding of how IPE can enhance collaborative patient-centered care?

Definition of Key Terms and Operational Definitions

Interprofessional Education (IPE): educational experience where two or more professions in the health and social care industry learn together during all or part of their professional training (Eccott, et al., 2013; WHO, 2010). The prefix “*inter*” from the Latin

term refers to “among, between”. The word “professional” as an adjective refers to being engaged in a specific activity as a paid occupation. When the term is combined with education the meaning then includes learning activities that take place between professionals regardless of their legal or educational status (Gilbert, 2012).

Interdisciplinary: when two or more professionals representing different professions work together to accomplish common goals (Eccott et al., 2013; WHO).

Professional Development: training of new skills to support advancement of knowledge of skills (Eccott et al., 2013).

Overview of the Research

Currently the world is facing a shortage of healthcare workers. Healthcare administrators and policy makers are working to develop effective strategies that can bridge the gap between patient needs and available resources (WHO, 2010). Many healthcare systems throughout the world are fractured and fragmented making it difficult to meet the needs of the populations. In current healthcare settings, professionals must be able to work collaboratively within a team of providers (WHO, 2010). A team of healthcare professionals can provide effective, comprehensive, and reliable patient care (Eccott et al., 2013). Communication skills are necessary for comprehensive conversations regarding patient care (Eccott et al., 2013; WHO, 2010).

It is estimated that approximately 70-80 % of healthcare errors are caused by human errors associated with poor communication and misunderstanding between healthcare providers. About 50% of the errors could be avoided through team-based communication. Improving the quality of clinical collaboration has been shown to result in fewer errors and patient mortality (Bleakley, Allard, & Hobbs, 2012).

The Framework for Action on Interprofessional Education and Collaborative Practice recognizes the fractured healthcare systems and the complexity of healthcare systems (WHO, 2010). The World Health Organization (WHO) is looking for ways to address the shortage of healthcare workers and adequately address patient's needs. Accordingly, the WHO is encouraging the implementation of IPE with the intent to develop a collaborative practice-ready workforce (WHO, 2010).

The terms “interprofessional” and “interdisciplinary” are often used interchangeably. An interprofessional/interdisciplinary practice is one which includes providers from a variety of professions working together sharing goals, resources, and responsibility of patient care. Interdisciplinary/interprofessional education uses the same approach in which two or more professions work collaboratively to teach communication skills and interaction between disciplines to achieve mutual goals and learning (Lam, Plein, Hudgins, & Strattan, 2013; WHO, 2010).

In 1972 the concept of interprofessional practice was discussed by the Institute of Medicine (Lam et al., 2013; WHO, 2010). In 2009, six health professions formed the Interprofessional Education Collaborative (IPEC) and recommended core competencies for IPE to promote interprofessional collaborative practice-ready healthcare providers. The six professions included medicine, nursing, dentistry, pharmacy, osteopathic medicine, and public health (WHO, 2010). In May of 2011, core competencies were developed by IPEC to encourage individual academic health professions to work toward including the competencies for IPE in their curriculum. Despite these efforts there are few reports describing the use of IPE and learning outcomes that include dental hygiene and nursing students (Eccott et al., 2013). The IPE domains and competencies generally

focus on collaborative teamwork encouraging communications, respectful behaviors, and patient-centered care. See Figure 1.

Competency/Domain	General Competency Statement
Domain 1 Values/Ethics for Interprofessional Practice	VE: Work with individuals of other professions to maintain a climate of mutual respect and shared values
Domain 2 Roles/Responsibilities	RR: Use the knowledge of one's own role and those of other professions to appropriately assess and address the healthcare needs of the patients and populations served
Domain 3 Interprofessional Communication	CC: Communicate with patients, families, communities, and other health professionals in a responsive and responsible manner that supports a team approach to the maintenance of health and the treatment of disease
Domain 4 Teams and Teamwork	TT: Apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan and deliver patient-/population-centered care that is safe, timely, efficient, effective, and equitable

Figure 1. IPE Domains and Competencies for Interprofessional Collaborative Practice (IPEC, 2011)

Understanding and implementing IPE into allied health education has potential to help provide a workforce of allied health practitioners prepared to adequately treat patients with health complications; specifically with patients undergoing cancer treatment. Providing a stronger workforce who can provide total patient care for the cancer patient may ultimately reduce oral complications, reduce cost of care, and increase patient survival. The following sections will provide supporting research for this proposed study of IPE on cancer patient care for nursing and dental hygiene students.

Cancer. Approximately 470,000 new cases of cancer are diagnosed annually (Wolff, Follmann, & Nast, 2012). It is estimated that oral cancer constitutes about 40,250 of the new cancer cases (Anderson, Meraw, Al-Hizaimi, & Wang, 2013). Cancer

of the head and neck region is the sixth leading cancer site with only a 50% survival rate over a 5-year period (Anderson et al., 2013; Turner, Mupparapu, & Akintoye, 2013).

All types of cancer treatment may predispose patients to oral complications (Wolff et al., 2012; Migliorati, Hewson, Lalla, Antunes, Estilo, & Hodgson, 2013). Treatments range from radiation, chemo-therapy, surgery, or a combination of these (Ben-Arye, 2010). Treatment choices can lead to a variety of oral complications. Some oral complications and side effects include mucositis, candidiasis, oral infections, herpetic lesions, osteoradionecrosis, xerostomia, and radiation caries (Ben-Arye, 2010; Wolff et al., 2012). Oral complications that affect patients receiving cancer treatment can lower quality of life, increase cost of care, and decrease patients' ability to eat (Ben-Arye, 2010; Kligler et al., 2012; Wardh, Paulsson, & Fridlund, 2009; Wolff et al., 2012). In addition, oral complications and side effects can postpone cancer treatment which can directly influence patient survival rate particularly in patients with head and neck cancer (Cummings, & Knapp, 2010; Lambertz, Cruell, Robenstein, & Mueller-Funaiole, 2010). Preventing or reducing oral complications can potentially benefit patients receiving cancer treatment by improving quality of life, reducing treatment breaks, and decreasing cost of care (Ben-Arye, 2010; Lambertz et al.; Turner et al., 2013).

Interprofessional cancer care teams. Proactively addressing and treating pain and side effects of cancer treatment of oncology patients requires the involvement of a team of multidisciplinary providers (Bainbridge, et al., 2011). Cancer care teams can include oncologists, osteopathic medicine, homeopathic medicine, social care, multidisciplinary nursing staff, pharmacists, physical therapists, and general supportive staff. Nurses and doctors screen and manage cancer treatment and physical symptoms such as

pain and nausea while a social worker might focus on the patients psychological and emotional needs.

Studies have demonstrated providers often do not assess side effect symptoms early enough or recognize needs of the patients in a timely manner (Bainbridge et al., 2011). Patients with cancer have significant burden of symptoms that can include high stress, fatigue, anxiety, depression, and additional side effects such as oral complications. Therefore, a multidisciplinary team of providers is necessary to treat cancer patients and their needs adequately (Bainbridge et al., 2011; Manne et al., 2007).

There are many different types of cancer and patients enter cancer treatment at different stages of their cancer. Having a multidisciplinary workforce of healthcare providers and support team allows the cancer care teams to address health complications that may occur during cancer treatment, reduce breaks in treatment, improve quality of life, and reduce treatment errors (Bleakely, et al., 2012; Bainbridge, et al., 2011; Chambers, et al., 2009; Manne et al., 2007).

Role of dental hygienist. Dental hygiene students spend at least two years in their respective programs studying the oral environment and oral health. Prior to admission to a dental hygiene program, students are required to take life science courses such as human anatomy and physiology, microbiology, nutrition, general organic and biological chemistry which all contribute to the dental hygiene students' knowledge base (Commission on Dental Accreditation [CODA], 2013). In addition, accreditation requires dental hygiene programs to provide content in dental sciences such as histology, embryology, general and oral pathology, head and neck anatomy, pharmacology, dental anatomy, periodontics, special patients, and medical emergencies (CODA, 2013). The

traditional pedagogy includes didactic instruction where case studies can be utilized. The experiential component of dental hygiene education includes simulation and hands-on clinical experiences. The dental hygiene curriculum helps prepare dental hygiene students to provide comprehensive patient care to a diverse population (Manne et al., 2003; CODA, 2013).

During the two-year program dental hygiene students learn to effectively assess, diagnose, treatment plan, implement, and evaluate dental hygiene oral care based on patient risk and needs (CODA, 2013). Students learn to use critical thinking to develop ethical decision making skills, enhance communication skills, work within public services, and perform continuous self-assessment for lifelong learning and professional development (Manne et al., 2003; CODA, 2013).

During dental hygienist students' final year of their program and following graduation, students must pass a series of comprehensive and skill based exams to obtain a license to practice dental hygiene (Manne et al., 2003). Dental hygienists who want to pursue additional education may seek a bachelor or master degree by taking additional coursework (Manne et al., 2003).

Dental hygienists administer therapies to treat oral disease as well as educate patients about the connection between oral health or the lack of oral health and overall health. They are often the first person in the dental setting to review the medical history and can screen for cancer risks due to high risk factors. Dental hygienists perform intra-oral and extra oral cancer screening as part of their treatment regimen. A dental hygienist has sufficient oral health knowledge making them, not only oral health specialists, but beneficial contributing members to a healthcare team (CODA, 2013).

Role of nurse. Nursing students are required to complete similar prerequisite courses as dental hygiene students. These courses may include anatomy and physiology, inorganic and organic chemistry, nutrition, microbiology, and composition courses. Nursing programs offer a complete and extensive set of courses that may include mental health, general medical family medicine, pharmacology, and courses that include didactic and simulation experiences supportive of nursing patient care (Clark College Nursing, 2013). The most singular function of nurses is to improve the human condition through academic programs in practical nursing providing additional education at the graduate level (National League for Nursing Accrediting Commission [NLNAC], 2013). However when surveyed medical professionals report receiving little oral health content in their educational programs or anywhere else (Huskinson, 2009). Consequently a low level of confidence of oral health understanding and knowledge and its application to patient care appears to be a gap in learning (Bell, Phillips, Paquette, Offenbacher, & Wilder, 2011; Huskinson, L.W., 2009).

Upon completion of a nursing program, students are required to take state and national testing in order to obtain a license to practice as a nurse. Continuing education courses are required for a nurse to be granted a continuing active license to practice nursing (Manne et al., 2003). If a nurse wants to specialize in a specific area, such as pediatrics, oncology, or any other medical specialty, additional education and training are necessary. Their role in patient care is as diverse and extensive as their education.

An oncology nurse provides multiple healthcare related services for cancer patients (Manne et al., 2003). They are expected to provide case management, indirect and direct patient care, and clinical support. They have the knowledge and understanding

of treatment procedures and goals. Even with their extensive knowledge of cancer treatment and procedures, many nurses believe they face a barrier in diagnosis and management of oral complications that can occur during cancer treatment (Manne et al., 2003). Oral symptoms, diagnosis, management, and treatment are reported as being significantly important in patient cancer care; however, it also presents a challenging responsibility for oncology nurses (Manne et al., 2003).

In a study conducted by Wilhelmsson, Svensson, Timpka, and Faresjo (2013), regarding nurses view of IPE and collaboration, it was stated that it is favorable for students to develop their own professional identity. When working with other professions during students' undergraduate studies, students can understand their roles and the roles of other professions and how health professionals interconnect in a patient-centered practice. Wilhelmsson et al., (2013) restated the WHO's statement of "learning together to work together" should be our focus in healthcare education.

Interprofessional education. Effective care for patients with chronic conditions is most often achieved when healthcare providers work together to complement their skills to meet patient's multifaceted healthcare needs (Cahill, O'Donnell, Warren, Taylor, Gowan, 2013; Pullon et al., 2013). The more complex the patient's needs, the more important collaborative healthcare is required. IPE provides a valuable tool in fostering and enhancing patient care (Cahill et al., 2013; Pullon et al., 2013). Literature indicates cancer patients can benefit from dental specialists' support during cancer treatment should oral complications arise (Migliorati et al., 2013; Wolff et al., 2012). Research and evidence has demonstrated that improving oral health and maintaining it during cancer treatment improves quality of life, cost of care is decreased, and patient survival rate

increases when cancer treatment is not delayed or stopped (Ben-Arye, 2010; Kligler et al., 2012; Wardh et al., 2009; Wolff et al., 2012).

Patient referrals to their dentists by their oncologists are recommended but studies indicate interprofessional collaboration rarely occurs with the oncology team and dentist (Bell et al., 2011; Manne et al., 2003). When communication does occur healthcare providers do not often understand the treatment modalities the respective professions provide. This lack of knowledge about healthcare team members may create uncertainties in treatment considerations as well as knowing what questions to ask of each other (Bell et al., 2011; Manne, 2003). Professionals brought together to communicate across professional boundaries will assist healthcare providers to better understand treatment procedures and patient's needs. Implementing IPE in health profession curriculum may provide students with experiences they can embrace as health care team members providing comprehensive patient-centered care.

Interprofessional education occurs when two or more students from different professions engage in communications. Students learn communication skills, effective team work, understand team-based healthcare, and cooperative skills that support collaborative practice (Eccott et al., 2013; IPEC, 2011; WHO, 2010). IPE prepares students to work effectively as an IP team member (Eccott et al., 2013). Collaborative practice-ready allied healthcare students are better prepared to respond to local healthcare needs and are prepared to improve healthcare outcomes (WHO, 2010).

Collaborative practice happens when several healthcare workers from different professions work together with patients, families of patients, care givers, and communities to provide the highest quality of healthcare possible (WHO, 2010). When

interprofessional collaborative practice is implemented a higher quality of healthcare is accessible with an emphasis on patient-centered health care delivered by a team of a variety of healthcare providers (IPEC, 2011). Collaborative practice-ready healthcare workers learn how to work in an interprofessional team and are competent to do so (WHO, 2010).

Training allied healthcare students with the intent to prepare them with interprofessional collaborative practice concepts requires educational pedagogy/andragogy that includes effective IPE theory. In May of 2011, the Interprofessional Education Collaborative (IPEC) developed a set of competencies titled, *Core Competencies for Interprofessional Collaborative Practice* (IPEC, 2011). The IPEC efforts were supported by the American Association of Colleges of Nursing, American Association of Colleges of Osteopathic Medicine, American Association of Colleges of Pharmacy, American Dental Education Association, Association of American Medical Colleges, and Association of Schools of Public Health. The goal of IPEC for IPE is to develop educational framework that prepare healthcare students for deliberately working together to build a safer and better patient-centered community orientated healthcare system (IPEC, 2011). Once a student understands interprofessional collaboration they are ready to enter the healthcare workforce as a valuable collaborative team member (WHO, 2010).

Within an IP team there are multiple health care professionals who provide ongoing patient care with varying degrees of responsibilities. The leaders and followers in the IP team can provide complementary roles and team member roles may shift depending on the requirements of patient care (Dow, Diazgranados, Mazmanian, &

Retchin, 2013). An example of varying roles of leaders can be demonstrated by discussing two potential leadership roles a nurse and a dental hygienist may engage in during cancer patient care. Dow et al., (2013), describes two forms of leaders: an internal and an external leader. An internal leader such as a nurse has knowledge of patient's clinical treatment and the team members contributing abilities. An internal leader such as a lead nurse would be directly involved in patient's ongoing care. An external leader such as a dental hygienist would be considered a consultant in determining treatment of conditions that a cancer patient may exhibit during their cancer treatment. The value of an external leader is the person can provide fresh ideas and treatment options directly related to their professional expertise benefiting patient care and treatment outcomes (Dow, Diazgranados, Mazmanian, & Retchin, 2013).

In 2010, Reeves, et al. conducted a systematic review which included six IPE studies of similar models including qualitative and quantitative research methods. The six studies that were included in the review were similar in research methods which were the reasons for including them in the study. However, all studies demonstrated increased levels of achievement of learning outcomes and improvements in patient care except one.

Evaluating IPE. The National Center for Interprofessional Practice and Education (NCIPE) states effective evaluations of IPE research allow for examination of accomplishments while making adjustments for future work. The Readiness for Interprofessional Learning Scale (RIPLS) can be used as a pre/post survey of IPE experiences in an academic setting. See Appendix A. The RIPLS was originally developed by Parsell and Bligh (2002) to evaluate attitudes and perception of students'

understanding of IPE. Currently, the RIPLS has become one of the most widely used instruments in research relating to IPE (Hertweck, et al., 2012).

A short report published by Doucet, Buchanan, Cole & McCoy (2013) discussed their experience using the RIPLS tool in evaluating their program's IPE course. The RIPLS tool was used as a pre and post survey to determine learning outcomes and student's level of IP agreement. An informal evaluation of the survey results demonstrate a trend toward improved IP awareness. Student feedback revealed a relatively high level of satisfaction with the course (Doucet et al., 2013).

The RIPLS tool is used to determine attitudes of participants during IP learning. The RIPLS tool was used in a study conducted by Medves, Paterson, Broers, & Hopman, (2013). Their study focused on determining student's attitudes toward integrated IPE into the curriculum by evaluating an IPE project which was a partnership between faculty and learners with both groups engaged in IP learning and planning activities. The participating programs included medicine, nursing, occupational therapy, and physical therapy. During the 33 months of the study, 1613 questionnaires were collected from 1711 participants. Pre and post survey data were available for 448 participants ($N=448$). The data from these surveys showed an increase in positive attitudes and t -test scores with a $p<.05$ (Medves et al., 2013).

A study conducted by Neville et al. (2013) used the RIPLS in a shorter period of time. The researchers used a cross-sectional format with students ($N=61$) from medicine, midwifery, and nursing who were recruited prior to the second year of their prospective programs. The RIPLS tool was completed as a pre and post survey. At the conclusion of the students' second year of their programs the RIPLS results showed a positive

improvement ($p<.05$) of the participants IP attitudes with the exception of two questions. Item 17 “The function of nurses and therapists is mainly to provide support for doctors” and item 18 “I’m not sure what my professional role will be”. Study investigators suggested the response may be due to the fact these students are either supporting divisions in professional roles and responsibilities or still feel some uncertainty in their professional roles.

Education models. Multiple education models are used within allied health education. Some current models are problem based learning (PBL), case studies, and simulation or a combination of any of these. Interprofessional groups of students using a PBL education model found their education enhanced by being able to develop communication skills and improved attitudes toward working as a team (Eccott et al., 2013). A short report of a study using a case-based model called MAGPIE conducted by Cahill et al. (2013), determined that by using their IPE client-centered model, students were provided a strong foundation for enhanced learning in a practice education setting.

Problem-based Learning. Problem-based learning (PBL) occurs when students are presented with a realistic, comprehensive clinical problem designed to prompt students’ critical thinking and reasoning skills while solving a problem (Billings & Halstead, 2012). The goal of PBL is to first construct an extensive and flexible knowledge base where students are given opportunities to apply learning. Through the process of a PBL experience students develop effective problem solving skills that support patient care. As students gain experience and confidence they discover a sense of self-directed and life-long learning skills while becoming effective collaborators. Combining PBL with IPE is an effective strategy that can enhance student’s

communication skills and attitudes toward working as a team (Billings & Halstead, 2012; Eccott et al., 2012). PBL learning experience is unique in that the experience can be used to include multiple topics from an entire curriculum rather than focus on specific disciplines or concepts. The use of PBL encourages students to acquire specific skills, knowledge, and abilities when solving a problem (Billings & Halstead, 2012).

A form of real-life PBL experience can include community based learning where students are exposed to actual patient care within collaborative groups. The professionals work together in a variety of settings that expose students to socialization processes increasing opportunities for students to engage in collaborative learning and working together. PBL in community-based environments can foster positive development of communication skills and the confidence to continue collaborative patient care beyond their education (Hosny, Kamel, El-Wazir, & Gilbert, 2013).

Eccott (2013) and her IP team developed, implemented, and evaluated an interprofessional problem based learning model (IP-PBL). There were five faculty members included in the study. The group represented medicine, pharmacy, nursing, physical therapy, and occupational therapy. The team developed a patient-centered IP-PBL module focusing on a new mother with low back pain and post-partum depression. The learning project evaluated a convenience sample of ($N=24$) students. The key themes in the evaluation and module included: content, process, learning, outcomes, and practical issues. The qualitative mixed method study included a pre and post-test and was designed to determine students' views and learning outcomes of IP-PBL experience. The study hypotheses were students would increase their positive responses to the effectiveness of IP learning, report high satisfactions of IP learning, and have a positive

view of IP-PBL learning. Most IP studies have indicated that IP works best with senior students. Eccott et al., (2013) used students from years 1-4 in their respected programs.

Students were placed in groups of five with each student representing a different profession. The focus group included a randomly selected sample from the students in the study that was facilitated by the investigators. Eccott et al. administered the pre and post questionnaires to students within their assigned groups. The results of the study demonstrated students favored the IP-PBL model. Their attitudes improved for 11 of the 16 evaluation items ($p < .05$). See Table 1.

Table 1

IPE Evaluation Items

Professional Role	($p < 0.001$)
Communication	($p = 0.02$)
Understanding role of others	($p = 0.002$)
Identification with the team	($p = 0.002$)
Comfort with members	($p = 0.047$)
Cooperation with team members	($p = 0.004$)
Team perceptions	($p = 0.04$)
Decision-making	($p < 0.001$)
Team efficiency	($p < 0.001$)
Minimal conflict	($p = 0.04$)
Group contributions	($p = 0.03$)

There were four scores on the evaluation that did not improve however; their pretest scores were high already. The four questions included students' opinion about the importance of communication, importance of collaboration, knowledge of members' roles, and being a team player. The lowest scores indicated 87.5% ($n=20$) of the students

felt the organization of the module was not satisfactory. On the post evaluation 100% of the students ($n=24$) “strongly agreed” or “agreed” the learning experience enhanced their understanding of IP teamwork. Students rated the quality of the IP-PBL learning process the highest in areas including fostering open, honest communication, and mutual trust with their groups. Additionally, students indicated the objectives of the module were achieved (Eccott et al., 2013). Statistically significant results were obtained using paired t -tests for pre and post scores. See Table 1.

Students indicated that in addition to the expected learning of the IP-PBL experience, they better understood how their scope of practice “fit” with other health professionals’ scope of practice. They learned how their profession added value to the healthcare team and patient care which increased their awareness of resources. The students recognized understanding their own and others’ roles in patient care increased their ability to make appropriate referrals. Students indicated being the only professional from their prospective field of study on the team added value and mutual respect within the team. This provided an element of professional responsibility. The overall IPE experience increased students’ confidence in collaborating with other professionals, improved patient-centered care, and improved practice readiness (Eccott et al., 2013).

Students reported multiple benefits of collaborative practice for the health care system in general. These benefits include cost and time savings, avoidance of overlap of treatment, and a breakdown of professional boundaries. Students stated the benefits of working together far outweigh the benefits of working alone. Those students who had a base knowledge of their own profession prior to the IP-PBL indicated they felt better prepared to contribute to their team. At the point of this study IP learning was an elective

course study. Students in the study believed IPE should be a requirement rather than an elective (Eccott et al., 2013). If healthcare students learn the value and function of a healthcare team with activities that reinforce practice based learning, they can be better prepared to act as change agents, leading and creating healthcare models that can reshape healthcare delivery, thus improving patient care and treatment outcomes (Dow et al., 2013)

Case studies. Case studies are used to provide a learning experience encouraging students to analyze a real-life situation as a way to understand specific topics from didactic content and the study of real life theory in a simulation like structure (Adamson & Kardong-Edgren, 2012; Billings & Halstead, 2012). The use of role play and learning presentation can be used to demonstrate student learning (Billings & Halstead, 2012). The value of using case studies in allied health education is that it can stimulate critical thinking, retention, and recall (Billings & Halstead, 2012).

Clinical case studies are an extension of case studies that support allied health learning. They are valuable teaching tools as well and can help students move from didactic knowledge, theory, and laboratory skills to the application of student's abilities in patient study cases which represent actual real-life situations (Packard et al., 2012). Didactic material can be presented in the case study format stimulating students' problem solving strategies in a safe environment where students learn from each other and the process (Billings & Halstead, 2012).

A study conducted by Kathleen Packard (2012) and her research team included the development and testing of a "Team Reasoning Framework" tool to be used for case study analysis with health profession students in IPE. The primary focus was to develop

IPE teaching and learning tools that can be used with case studies. The pilot study determined to evaluate Packard et al.'s "Team Reasoning Framework" and to test its ability to facilitate teaching and learning effectiveness when using case studies. The hypothesis was if students used the framework they would have a better understanding of how to work as part of a team that would correlate to better student performance in working up the patient case study (Packard et al., 2012).

The study included five health profession students from dentistry, medicine, nursing, occupational therapy, pharmacy, and physical therapy ($N=30$); who were all in their final year of didactic training just before clinical training took place. A recruitment email was sent to all students in the various health professions. The first students who responded ($N=18$) were randomly placed into three groups and were given a pre-survey regarding IPE and case study understanding (Packard et al., 2012).

The investigators informed the students they had 45 minutes to prepare and articulate a case study plan and their interactions would be video-taped. The students were blinded in that they did not know each group would receive different aides in this assignment. The first group ($n=6$) was given the case study only. The second group ($n=6$) received the case study and the IP Team Reasoning Framework. The third group ($n=6$) received the case study, IP Team Reasoning Framework, and watched two video examples of IP faculty working up a different case. The video samples showed a poor example of team interaction case study work up and a good example of team interaction case study work up. Faculty facilitators were given a script that included instructions for the students. The faculty facilitators did not interact or discuss the case studies beyond the script instructions (Packard et al., 2012).

At the end of the time allotted, students came together and were debriefed. Students were given post surveys ($N=18$) and were able to provide feedback on the experience. The faculty, comprising a representative from each profession, viewed and scored the videos using a rubric the researchers designed. The students' surveys and the faculty assessments were combined and analyzed. The results determined the experience provided improved understanding of IPE however, the team that received the video training showed significantly higher scores. Out of a total possible of 12 points, team one scored 6 ± 1.87 , team two scored 5.40 ± 1.14 , and team three scored 10.40 ± 0.89 with a statistical significance of $p=.009$. Packard et al. demonstrated their IP Team Reasoning Framework benefited students' learning and demonstrated improved IP skills; however, pre-training was the common factor that appeared to increase student outcome (Packard et al., 2012).

Further discussion regarding the framework concept and IPE suggested IPE approaches generally focus on PBL, small-group teaching, case studies, and experiential work experience. Packard et al. (2012) concluded IP team development and communication skills should be intertwined into the curriculum to help students become more prepared for interprofessional collaboration.

Simulation. Simulation education is becoming a common entity in program curricula (Tullmann, Shilling, Goeke, Wright, & Littlewood, 2013). In patient care professional education, simulation includes activities that attempt to recreate patient-care experiences the student may actively participate in to learn skills, problem solving, decision-making, and reflection (Adamson & Kardong-Edgren, 2012). The value of simulation aligned with real-life experiences are: it can promote deeper learning which

has been identified as a key component in IPE and improve critical thinking (Packard et al., 2012). Dow et al., 2013 suggests that IPE behaviors are best taught through IPE theoretical foundations with sequential learning activities reinforced through simulation-based learning including proficiencies with feedback and reflective learning.

Simulation can be used in a variety of academic experiences and applicable for use with multiple levels of teaching methods. The use of slides and video presentation represent virtual simulation of real life experiences brought into the academic settings. Students do not have to be in a clinical setting to see examples of patient care. The clinic experience is brought to the student in a learning environment. High fidelity simulation uses a physical model to represent actual patients. They are used to teach methods and techniques which represent real life experiences. This helps students to experience hand-on procedures prior to live patient care. High fidelity simulation includes electronic mannequins which have the capability to provide technical feedback and evaluation of student's performances. The simulation experiences help to prepare students for application knowledge with live human patients.

The *Journal of Interprofessional Care* published a short report outlining an IPE and simulation project by Tullmann et al. (2013) at the University of Virginia School of Nursing and School of Medicine. They retrofitted their existing simulation program to design and implement a simulation scenario for IPE to determine potential for increased learning outcomes of their students in their respective programs focusing on emergency procedures. The project experienced a variety of barriers and crises when an original School of Medicine faculty member became unavailable just before the implementation of the project. The team was faced with having to abandon the project or restructure

components of it to allow the project to continue. Time was a strong barrier because the team did not have the staff resources to devote to restructuring the components.

Despite the challenges, the project facilitators determined they experienced success in student learning as well as the faculty. When the faculty collectively evaluated the project they determined the learning and positive experience was achieved because the participating faculty effectively practiced communication, professionalism, shared problem-solving, decision-making, and conflict resolution. These key components were exhibited by students in the program as well and expressed in the student feedback. SIM-IPE is still in its formative stage of development and remains unproven (Tullmann et al., 2013). However, the faculty determined the project results indicated that SIM-IPE can positively affect the attitudes, performance, and learning for students (Tullmann et al., 2013). Including simulation and IPE into allied health curriculum can improve student preparedness for clinical patient care (Bandali, Craig, & Ziv, 2012)

An independent study designed to evaluate a simulation training program for IPE which was conducted by Ross, Anderson, Kodate, et al. (2013) stated that a breakdown in communications and teamwork compromises patient safety and has prompted advances in simulation training for healthcare providers. Their study determined to evaluate quality of care for older patients testing a PRO-CARE program using a variety of simulation experiences with teams of staff ($N=20-30$) in a tertiary hospital trust which provided a wide range of older patients and services. The teams were trained in their groups and put through simulation experiences during a 2-day session. The teams received nine weeks of post-training where they were observed and evaluated in their performances. All members of the teams filled out a pre and post module survey to

determine their level of self-confidence on key competencies (e.g., ‘communicating effectively with colleagues’; ‘identifying the needs of the older patient and their relatives’) with a reliability for nine items of $\alpha=95$.

Staff participants reported the course had clarified roles and responsibilities between allied healthcare teams which lessened the tension between members and increased appreciation for team members. The respondents reported teamwork was strengthened because of the clearer understanding of roles and boundaries that increased awareness of the impact of their actions on others.

The PRO-CARE program focused on communication skills with all team members as well as patients and their families. Post-course interviewees reflected on how spending more time getting to know patients enhanced patient care and clearer communication with family members and healthcare providers.

Summary

The theoretical framework of IPE and its potential for increased learning and providing collaborative practice-ready workforce has been documented. The IPE approach to learning can allow for sharing of expertise and individual professional perspectives by combining resources in order to formulate patient care goals while improving patient care outcomes (Inuwa, 2012). Understanding how to bring the IPE framework established by the WHO in 2010 and the core competencies created by IPEC together in the allied health academic setting will provide preliminary models for dental hygiene and nursing programs to further improve IPE learning for allied health students. Studies have determined IPE becomes more effective when the principles of adult learning are used such as PBL with case studies and clinical experience (WHO, 2010).

These learning methods reflect real world practice and are applicable to building student skills. Optimal learning experience and interaction between students should include PBL activities, a case study, and simulation using critical thinking exercises and reflective opportunities supporting students' learning experiences. This study will include PBL case study learning activities enhanced with a modified simulation component in the student experience.

Research has demonstrated students who receive training in interprofessional collaborative patient care understand the value of communication skills and patient-centered healthcare (Tullmann et al., 2013). Furthermore, the expanding scope of practice for many health professions has increased the abilities for practitioners to contribute to IP teams (Dow et al., 2012). Interprofessional education benefits students learning. There are many barriers that make implementing IPE a challenge however, the value of IPE and students' learning outcomes far out-weigh the challenges the IPE implementation provides. Patients who are treated by a team of healthcare professionals realize the value in their healthcare treatment and often experience fewer complications. Cost of healthcare is lower and treatment outcomes are better (Lambertz et al., 2010).

Methodology

Research Method or Design

This study used a quasi-experimental design with a convenient sample of allied health students from Mount Hood Community College (MHCC) surveyed before and after an IPE experience. Participants ($N=64$) listened to and participated in a module of instruction providing information about IP and potential oral complications for cancer patients during cancer treatment. Teams of nursing and dental hygiene students were organized into small groups and provided a PBL case study enhanced with a modified simulation educational module for treating oral complications in cancer patients. The modified simulation portion of the case study used radiographs, periodontal and existing dental restoration charts, study models, a PowerPoint© presentation, and an Oncology nurse as a guest speaker. The PBL case study included decision making, critical thinking, and reflective learning experiences using the MAGPIE template for the learner case study activity. Each IPE team developed treatment options and determined best practices on how to provide comprehensive patient-centered care using the MAGPIE template. The PBL case study and modified simulation activity were aligned with a real life situation. The case study provided students with a learning experience allowing application of learned knowledge regarding patient oral health during cancer care. Interprofessional Education Collaborative (IPEC) core competencies were incorporated within the training, student lesson plan, and assessment tools. Domain 2 Roles/Responsibilities for Collaborative Practice and Domain 3 Interprofessional Communication (IPEC, 2011) were the IPEC core competencies used in the lesson plan.

The study sought to determine if the implementation of an IPE module on oral care for the cancer patient would (1) improve students' knowledge of oral care for the cancer patient, (2) improve students' communication skills and perception of their own role on a cancer care team, and (3) help students develop an understanding of how IPE can enhance collaborative patient-centered care.

Utilizing SurveyMonkey®, all students completed a demographic survey before module implementation. See Appendix A. Prior to and upon completion of module, students were administered a pre and post survey using SurveyMonkey® comprised of the Readiness for Interprofessional Learning Scale (RIPLS) to determine student's level of understanding for teamwork and collaboration, negative and positive professional identity, and roles and responsibilities (NEUSIPE). See Appendix B. In addition to the RIPLS a PI-designed multiple-choice survey was included in the pre and post assessment to determine module learning outcomes. See Appendix C. The PI obtained permission to use the RIPLS from the NEUSIPE online resources. See Appendix D.

Procedure

Human subject's protection / Informed Consent. Because the PI is a graduate student at Eastern Washington University (EWU), the Institutional Review Board (IRB) for EWU approved this study prior to implementation. The PI asked MHCC IRB to allow EWU to be the supervising IRB. The IRB from MHCC reviewed the study proposal and granted their approval prior to EWU's IRB approval. See Appendix F. The IRB approval from EWU was therefore granted. See Appendix E.

Prior to enrollment in the proposed study, the PI invited nursing and dental hygiene students matriculated in the MHCC respective programs to participate in the

study and attend an informational meeting through email contact. See Appendix G. The PI communicated with the nursing and dental hygiene program directors to obtain student emails and arranged a time to meet with the perspective subjects to explain the study. The invitation letter sent via email to all potential participants explained the study, their role, and the PI's credentials as well as the time and place of the initial study meeting. At the designated time, the PI met with the students and provided a letter from the PI to inform students of their voluntary status, the benefits of participating in the study including documentation of research participation on their professional resumes. The PI assured potential subjects there would be no negative effects if they chose not to participate. The PI advised all students of how study results would be published and all personal data collected kept confidential. In addition, the PI provided contact information to the students for herself, her thesis advisor, and the EWU IRB. Subsequently, students had an opportunity to ask questions of and have them answered by the PI. Then, the PI asked all study participants to read and sign a consent form giving permission for study enrollment that included participation in a module on oral healthcare for cancer patients and collection of demographic information with pre and post survey scores. See Appendix H. Each student enrollee received a copy of the signed consent form for their personal records and was asked to verify an email address for the pre/post survey links to be sent to them. During the week prior to the actual study, the PI emailed participants a test email to ensure email address accuracy.

The PI created a SurveyMonkey® account to build the pre/post surveys that included demographic items, RIPLS, and PI-designed multiple-choice tests. The survey links were emailed to the participants on the day of the module implementation. The PI

brought ten hard copies of the surveys for those students who may not have access to the survey links. The hard copy surveys were manually input into the Survey- Monkey® account by the PI. By using SurveyMonkey®, the data collection was double-blinded and provided complete privacy for participants because the survey link did not link back to the students or their emails providing complete anonymity.

Sample source, plan, sample size, description of setting. The PI is an adjunct professor in the Dental Hygiene Program at MHCC, a local community college in Northwest Oregon and had access to allied healthcare students. For pragmatic reasons, a sample was obtained by enlisting volunteer nursing and dental hygiene students enrolled in the MHCC dental hygiene program as first year or second year students and the MHCC nursing program as senior nursing students. All students had completed similar pre-requisites prior to admission to their respective programs including basic anatomical sciences, communications, math, chemistry, English, and microbiology. The PI gathered demographic data including participant year in and program of study, age, academic background, and ethnic data with the demographic questionnaire. See Appendix A.

The MHCC Dental Hygiene program and Nursing program had 18 first year dental hygiene students, 18 second year dental hygiene students, and 30 senior nursing students. The senior nursing students are required to complete community service hours in their curriculum and MHCC requested these senior students be included in the study. The MHCC first year nursing students were invited to participate however they were not required to complete community service hours and chose not to participate. The PI attempted to enroll all students providing a sample size of a minimum of 64 students ($N=64$).

The PI met with the MHCC nursing and dental hygiene program directors to arrange a time to explain the study to potential study subjects, conduct the study consent process, and implement the study. To conduct the study, the PI reserved a lecture classroom and computer lab at MHCC. The computer lab allowed students to access SurveyMonkey® to collect demographic data, RIPLS, and PI-designed survey study data. The PI attempted to accommodate all participants and faculty needs including providing snacks at the end of the meetings and module. The PI provided initial meeting time, module dates, times, and locations to subjects and faculty via e-mail.

In studies conducted by Eccott et al. (2012) and Neville et al. (2012) a variety of student academic levels were included. Upon conclusion of these 2012 studies, student surveys and study outcomes demonstrated a high level of learning within mixed groups. Students reported they felt challenged as a first year student and engaged as a senior student. The Eccott et al.(2012) and Neville et al.(2012) conclusions provided the basis for the PI to place two first year students and two second year students from the dental hygiene program and four to five senior nursing students from the nursing program into homogenous allied health teams. This distribution resulted in four groups of nine ($n=9$) and five groups of eight students ($n=8$). See Appendix I.

Variables. The independent variable was the IPE instruction module utilizing a PBL case study with a modified simulation experience. The module included specific learning objectives related to the IPEC Core competencies noted in Figures 2 and 3.

Domain 2 Roles/Responsibilities	RR: Use the knowledge of one's own role and those of other professions to appropriately assess and address the healthcare needs of the patients and populations served.	RIPLS Items
RR 1	Communicate one's roles and responsibilities clearly to patients, families, and other professionals	1, 5, 13
RR 2	Recognize one's limitations in skills, knowledge, and abilities	2, 3, 6,9
RR 7	Forge interdependent relationships with other professions to improve care and advance learning	1, 2,8,15
RR 9	Use unique and complementary abilities of all members of the team to optimize patient care	1, 2, 3, 15 ,16

Figure 2 Core Competencies for Interprofessional Education: Roles and Responsibilities

(IPEC, 2011)

Domain 3 Interprofessional Communication	CC: Communicate with patients, families, communities, and other health professionals in a responsive and responsible manner that supports a team approach to the maintenance of health and the treatment of disease.	RIPLS items
CC 3	Express one's knowledge and opinions to team members involved in patient care with confidence, clarity, and respect, working to ensure common understanding of information and treatment and care decisions	2, 3, 5,7, 13, 14
CC 4	Listen actively, and encourage ideas and opinions of other team members	7, 13, 14
CC 6	Use respectful language appropriate for a given difficult situation, crucial conversation, or interprofessional conflict	7, 14,15 ,16
CC 7	Recognize how one's own uniqueness, including experience level, expertise, culture, power and hierarchy within the healthcare team, contributes to effective communication, conflict resolution, and positive interprofessional working relationships	4,6,8,9
CC 8	Communicate consistently the importance of team work in patient-centered and community-focused care.	1, 2, 13

Figure 3 Core Competencies for Interprofessional Education: Interprofessional

Communication (IPEC, 2011)

The dependent variables were the student learning outcomes that include student knowledge, improved communication, and understanding IPE. In this study, the

competencies in the domains of Roles/Responsibilities for Collaborative Practice and Interprofessional Communication were assessed as well as the gained knowledge on providing oral care for the cancer patient (IPEC, 2011). The RIPLS item scores provided data on meeting the IPEC core competencies. See Figures 2 and 3 for the specific competencies within the IPEC domains that the module content and interprofessional activity focused on as well as the related specific RIPLS items. A PI-designed multiple-choice survey assessed student learning related to providing oral care to the cancer patient. The next section discusses these instruments.

Instruments. The RIPLS was used for the pre and post module survey to determine student attitudes towards IP. This 19 item, 5-point Likert tool has four subscales: teamwork and collaboration, negative professional identity, positive professional identity, and roles and responsibilities (NEXUSIPE, Parsell and Bligh, (2005). The initial 19 item scale used three subscales. A more stable subscale model with improved internal consistency and an emphasis on roles and responsibilities was developed in 2005. This study used the improved version that included a 19-item scale using a 5-point Likert scale with the four subscale evaluations described in Figure 4. (Hertweck et al., 2012). The end points of the Likert scale are “strongly disagree (1) to “strongly agree (5). McFadyen et al. (2012) found the RIPLS subscales and individual items were valid and reliable for testing IPE.

The Teamwork and Collaboration subscale evaluates participants’ attitudes regarding IP collaboration between students of different professionals including communication, trust, respect, and professional limitations. A high score suggests the student agrees with these concepts (Hertweck et al., 2012).

SUBSCALE	ITEM NUMBER	TOTAL POSSIBLE SCORE
Teamwork and Collaboration	1-9	45
Negative Professional Identify	10-12	15
Positive Professional Identity	13-16	20
Roles and Responsibilities	17-19	15

Figure 4 RIPLS 19 Item Likert Survey with Four Subscales (Hertweck et al., 2012)

Negative Professional Identity evaluates negative statements regarding the students' attitudes of working with other allied health students. A high score would indicate the student does not value cooperative learning with students of other health professions (Hertweck et al., 2012).

Positive Professional Identity relates to items regarding shared learning experiences with other health care profession students as improving communication, problem solving, and team skills (Hertweck et al., 2012). A high score would suggest the student valued shared learning and would welcome additional opportunities to increase their knowledge through small interprofessional groups work.

Roles and Responsibilities Identity relates to the understanding of their roles as a healthcare provider (Hertweck et al., 2012). A high score suggests the student is unclear or has a misperception of their own role, as well as the role of other students in their respective profession.

Studies using the RIPLS as pre and post tests were conducted by Medves et al. (2013) over a period of 3 years and Neville et al. (2013) during one academic year. This study used the RIPLS tool in a module conducted over a 2-3 hour period. It was the

intent of this study to evaluate IPE conducted over a shorter time-period for potential improvements in attitudes towards IP.

The PI-designed multiple-choice survey assessed student knowledge before and after the module implementation. The multiple-choice items were based upon module learning objectives within the affective and cognitive domains and designed collaboratively with guidance from thesis advisors. See Appendix C.

A demographic questionnaire was included in the pre-survey. Items identified participants' background, including respective discipline and year in program, gender, age, and ethnicity. See Appendix A.

Equipment. For pragmatic purposes, the PI conducted the study at MHCC. The PI used classroom space at MHCC equipped with a screen and LED projector for presenting the study and module content to students and faculty. The PI provided and used a thumb drive with the module contents as well as printed consent forms, letters to participants, and pre and post surveys. The PI's personal laptop was used for data input and analysis. All students used the same case study.

Steps to implementation. Upon proposal and IRB approval by EWU and MHCC, the PI implemented the study in several stages. The PI was cognizant of the importance of time for both students as well as faculty and tried to adhere to the proposed times for each stage of study implementation.

Stage 1 Communicate with Faculty. The PI communicated with MHCC dental hygiene and nursing faculty to set up a meeting with dental hygiene and nursing students to introduce the study and obtain consent for their voluntary participation. The MHCC nursing program required a community service component to their program.

Participation in this study helped the students meet their programs requirements. The PI asked permission to use an email distribution list of all dental hygiene and nursing students from each respective program. The PI then arranged a classroom for this meeting and emailed all potential student participants using student email lists using the blind carbon copy (bcc) feature for sending email in order to maintain email privacy.

Stage 2 Study Informational Meeting. At the arranged meeting time and place the PI presented a short PowerPoint© presentation on the proposed study to all students attending. In addition, the PI read through and provided a letter to each student explaining the study and the participants' roles in the study. The PI invited student questions and answered them. Subsequently, the PI explained the consent process and obtained consent by having each student who volunteered to participate in this study sign a consent form. Each participant received a signed copy of the consent form for their records. The PI informed students of the prearranged time for the module implementation. Each student received a snack at the completion of the informational meeting.

Prior to module implementation, the PI sent an email reminder to students and faculty. In an attempt to enroll all students the PI was available to any students who missed the information meeting to explain the study and obtain consent following the same protocol as described in Stage 2. Three dental hygiene students had conflicting schedules. The PI emailed all handouts to these students and personally met with them on campus to review study contents and collect their consent forms.

Stage 3 Module Preparations.

The PI opened a SurveyMonkey® account and developed a pre and post survey including demographic, RIPLS, and PI-designed multiple-choice test questions. A test

email was sent to participants to verify the email obtained was accurate. Any emails that were incorrect or invalid were corrected. The PI emailed a link to the survey to each participant on the day of the study.

A manila envelope was prepared for each participant with their name on it, participation certificate, a thank you note, and handouts for module. The PI used a master list of participants and randomly divided the students into homogenous interprofessional groups or teams to work on the module case study. The PI arranged to bring snacks, toothbrushes, and sample size toothpaste for all participants.

The PI verified classroom availability and equipment systems. To assure a timely implementation and evidence-based content, the PI reviewed the Oral Cancer Care module and conducted a practice of the module presentation.

Stage 4 Presentation of Module. On the day of the module implementation, the PI arrived two hours early to set up the classroom and rehearse the presentation. Using the master list, the participant's packet or manila envelope with participant's name and team letter on it were placed in groups in different parts of the room. Upon arrival the participants were instructed to find their IPE health care group by locating their envelope with their name on it. The master list of participants and their groups helped participants find their team.

The PI presented a PowerPoint© presentation outlining the study events including pre-survey instructions, IPE, module content, MAGPIE training, case study small group work, and post-survey instructions. See Appendix J, K, L, and M. Participants were instructed to complete the pre-survey in the computer lab or on their personal laptops before the module started.

Stage 5 Module Pre-test. The PI administered the pre-test RIPLS and PI-designed multiple-choice survey through a link to SurveyMonkey®. Each participant received an emailed link to the survey. Once participants had completed the pretest using the computer lab or their own lap tops the module commenced. This stage took about 5-10 minutes.

Stage 6 Presentation of Module Content. Upon completion of all pretest surveys, the PI presented the module content to the students. Topics on IPE and oral cancer care included prevalence of cancer, oral complications that may occur with cancer care, implications of cancer treatment stops, and an overview of potential oral complication treatments. At the conclusion of the module, students were briefed on the PBL case study enhanced with a modified simulated experience that aligned with a real life situation. An Oncology Nurse attended and was available to answer questions and provided input. The module presentation took about 25 minutes. See Appendix K and L.

Stage 7 Case Study. After the PI presented the module content and answered any questions, the participants received basic training on how to use an IPE case-based teaching model referred to as the meet, access, goal set, plan, implement, and evaluate model (MAGPIE). The MAGPIE model is an interdisciplinary case management process. The six stages of the model are defined in Figure 5.

Each team received a manila envelope with case study components and a MAGPIE template model to assist them in developing a patient care plan. See Appendix M. Participants had 40 minutes to work collaboratively and formulate their plan. The PI led a 5-10 minute debriefing session on the case study.

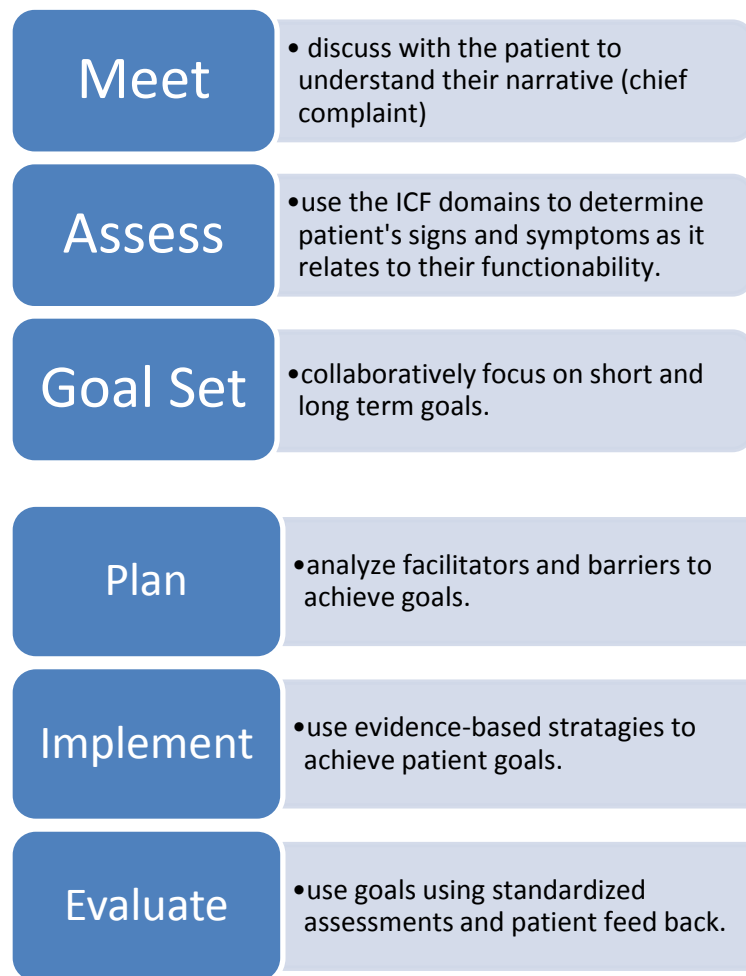


Figure 5 The MAGPIE process, a method for case based teaching and learning.

(Cahill, O'Donnell, Warren, Taylor, & Gowan, 2013)

Stage 8 Post Test. After the module case study debriefing, the PI provided time for participants to complete the post-test RIPLS and PI-designed multiple-choice survey. Each participant used the computer lab or used their laptop to complete the post-survey via SurveyMonkey®. Any students who were unable to open links to surveys used a hard copy to provide their answers. Each student received a snack after completing their posttest surveys which took about 5-7 minutes. After the surveys were completed, each participant placed a drawing ticket into a bag and four tickets were drawn. Each winning

ticket holder received a Starbucks® gift card. At the completion of the drawing the PI thanked and dismissed all participants.

Summary

This chapter discussed the methods and procedures used to evaluate dental hygiene and nursing students' learning and attitudes including understanding professional roles, teamwork, and communication skills gained during the implementation of an IPE module on the oral care of cancer patients. Quantitative data was gathered and statistically analyzed to compare participant's pretest and post-test RIPLS and PI-designed multiple-choice test scores. An open ended question requesting comments regarding the module content and IPE added anecdotal data. The next chapter will discuss findings of this study.

Results

Description of Sample

The PI recruited nursing and dental hygiene students from MHCC. The MHCC dental hygiene program director and second year lead instructor in the nursing program provided contact information for their respective students. The MHCC nursing and dental hygiene students were emailed an invitation to attend an informational meeting regarding the study. See Appendix G. To ensure all students received the invitation the PI provided the MHCC program director and instructors a copy of the invitation which was posted to the student's program portal. Both first and second year nursing students were invited to participate however only second year students elected to be a part of the study ($n=30$). All of the dental hygiene first year and second year students were invited. Of the 18 invited second year dental hygiene students, 16 participated ($n=16$); all 18 of the first year dental hygiene students agreed to participate ($n=18$). A total of 64 students ($N=64$) enrolled in the study and signed the consent form. In addition to the students, the dental hygiene program director and second year nursing instructors asked to participate bringing the total number of participants to 66 ($N=66$). However, for academic and study purposes, statistical analysis included students responses only. Attending faculty member's participation was primarily as observers and their personal interest in the module topic.

Statistical Analysis

Pre-module and post-module data was collected from the demographic questions, RIPLS, and PI-designed multiple-choice test using SurveyMonkey®. The night before

the module implementation, a SurveyMonkey® link was emailed to study participants ($N=64$) to collect pre-survey data. The PI sent the post-survey link the day of the module implementation and it remained open for a week to allow for more responses.

The PI exported data collected from Survey Monkey® into an Excel® spread sheet. Excel® 2010 and a SPSS ©Version 21 statistical data analysis package were used for analysis. Data was collected and stored on a secure password-protected computer. Missing data or incidental duplicated surveys were identified through analysis of completed surveys and student's identification numbers. The duplicated surveys were excluded from analysis and only missing data from skipped questions were omitted. Demographic, RIPLS, and PI-designed multiple-choice question response data were gathered through the same process and analyzed for descriptive purposes and are not generalizable. The response data represented 53% ($n=34$) dental hygiene students and 47% ($n=30$) nursing students of the total participants. The year in program response indicated that 28% ($n=18$) were first year and 72% ($n=46$) were second year dental hygiene and nursing students. The level of education was a variable in this study however the impact of level of education on IPE was not statistically analyzed (Eccott et al., 2012; Neville et al., 2012). See Table 2.

Table 2

Year in Respective Program

Answer Options	Response Percent	Response Count
First Year	28.0%	18
Second year	72.0%	46
Other (please specify)	0.0%	0
<i>answered question</i>		64

Demographic data. The demographic data included questions regarding program of study, year in program, gender, age, and ethnicity. See Table 3. There were four male and 60 female participants. The age range was between 20 and 60 years of age. The ethnicity of the study population included 89% ($n=57$) Caucasian, 6% ($n=4$) American Asian/Islander, 2% ($n=1$) Hispanic, and 3% ($n=2$) identified themselves as Other with an unstated ethnicity.

Table 3

Demographic Characteristics

CHARACTERISTIC	DEMOGRAPHIC	PERCENT (%)	($n=$)
Program of Study	Dental Hygiene	53%	34
	Nursing	47%	30
Year in Program	First Year Dental Hygiene	28%	18
	Second Year Dental Hygiene	25%	16
	Second Year Nursing	47%	30
Gender	Male	6%	4
	Female	94%	60
	Other		
Age	18-20		
	20-25	42%	27
	26-30	28%	18
	31-35	9%	6
	36-40	10%	7
	41-45	5%	3
	46-50	4%	2
	51-60	2%	1
Ethnicity	Caucasian	89%	57
	African American		
	Asian American/Pacific Islander	6%	4
	Hispanic	2%	1
	American Indian/Alaskan Native		
	Other	3%	2

First hypothesis. To measure a change in the first hypothesis, “Does the implementation of an IPE module on oral care for the cancer patient improve dental hygiene and nursing students’ knowledge of oral care for the cancer patient?” a paired *t*- test of the pre and post PI-designed multiple-choice test total scores and frequency distribution between pre and post scores of the multiple- choice test items was analyzed. The multiple-choice answers are dependent variables within the same populations and therefore a paired *t*- test of the pre and post PI-designed multiple-choice total scores suggests a statistically significant difference with a $p < 0.005$. See Table 4. Analysis of the individual questions on the multiple-choice survey suggested an improvement in knowledge for all items. See Table 5. This along with the significant improvement of the total multiple-choice test scores suggests the rejection of the first null hypothesis. The study participants did demonstrate an improvement in knowledge of oral care for the cancer patient. See Table 4 and 5.

Table 4

Paired t-test for Pre and Post PI-designed multiple-choice total scores

Paired differences between the pre and post PI-designed multiple-choice total scores							
<i>M</i>	<i>SD</i>	<i>SEM</i>	95% Confidence Interval of the Difference		<i>t</i>	df	Sig. (2-tailed) <i>p</i>
			Lower	Upper			
-29.3548	8.846	1.1235	31.6015	-7.1082	-26.127	61	.000

Table 5

PI-Designed Multiple-Choice Module Questions Pre and Post Survey Comparison.

RIPLS Questions	Pre-Survey	Post-Survey	Differences Pre/Post Surveys
1. Which of the following statements best describe interprofessional collaborative practice?	77.9% (n=53)	92.5% (n=62)	+14.6% (n=9)
2. Patient centered care can be described as:	83.6% (n=56)	98.5% (n=65)	+14.9% (n=9)
3. Which oral health complication occurs most often when patients that is being treated for cancer and is responsible for most treatment breaks?	52.9% (n=36)	89.6% (n=60)	+36.7% (n=24)
4. The term “interprofessional” can be interchanged with and means the same as:	53.7% (n=36)	76.1% (n=51)	+22.4% (n=15)
5. All of the following are potential consequences of cancer treatment that patient’s may be faced with during treatment EXCEPT:	75% (n=51)	89.6% (n=60)	+14.6% (n=9)
6. Radiation and Chemotherapy almost always results in some form of oral complications.	82.4% (n=56)	97.0% (n=64)	+14.6% (n=8)
7. Cancer of the head and neck region is the sixth leading cancer site with what percentage of a survival rate over a 5 year period.	11.8% (n=8)	83.3% (n=55)	+71.5% (n=47)
8. The potential roles that a dental hygienists and oncology nurse may play in the treatment of cancer patients can be termed respectively as:	11.8% (n=8)	76.1% (n=51)	+64.3% (n=43)
9. Approximately 70-80 % of healthcare errors are caused by human errors associated with what?	70.1% (n=47)	94.0% (n=63)	+23.9% (n=16)
10. It is best practice to take measures to prevent oral complication and/or treat them early when they occur rather than wait for them to decrease patient’s quality of life.	92.6% (n=63)	98.5% (n=65)	+5.9% (n=2)

Second hypothesis. To test the second hypothesis, “Can an IPE module on oral care for cancer patients improve dental hygiene and nursing student’s attitudes about communication skills and understanding of their roles as an oral health care provider by improving student’s perception of their own role on a cancer care team?” A Wilcoxon-signed ranked test was used to analyze the pre and post RIPLS subscales as seen in Table 6. All subscales demonstrated a statistical significance when comparing the pre and post RIPLS subscale scores.

Table 6

Wilcoxon-signed ranked test for RIPLS Pre and Post Subscales

Wilcoxon-Signed Ranked Test for Pre and Post RIPLS Subscales								
Subscale	Item Numbers	Total Possible Score	<i>M</i> Pre Post	<i>SD</i> Pre Post	<i>SE</i> Pre Post	<i>N</i> Pre Post	<i>Z</i>	<i>P</i>
Teamwork and Collaboration	1-9	45	39.25 42.20	5.421 3.846	.694 .492	61 61	-3.140 ^b	.002
Negative Professional Identify	10-12	15	5.56 4.50	2.454 2.094	.312 .266	62 62	-2.515 ^c	.013
Positive Professional Identity	13-16	20	16.79 26.85	2.847 3.793	.362 .482	62 62	-6.861 ^b	.001
Roles and Responsibilities	17-19	15	7.13 33.98	2.761 5.237	.351 .665	62 62	-6.862 ^b	.001

b. Based on negative ranks.

c. Based on positive ranks.

In addition, responses from the open-ended question at the end of the RIPLS provided anecdotal information regarding participant’s module evaluation. See Table 7.

The opened ended question following the RIPLS asked participants to express any thoughts or comments regarding module content. All comments were positive however varied in their focus. Three comments specifically discussed participant's evaluation of the content of the module. Their comments voiced that the content of the module will provide them with valuable information on how to address oral complications exhibited by cancer patients. There was one comment that discussed their optimistic view of the IPE content and how it will provide a greater understanding of how to work as a team member to provide oral care for cancer patients. The pre-survey resulted in one response and the post-survey resulted in six responses to the open ended question. There were no negative responses in the pre and post-survey. All comments appeared to be from nursing students. The lack of responses may be because participants did not have anything additional to comment upon.

Statistically significant differences in the pre and post RIPLS subscales scores and anecdotal participant comments rejects the null hypothesis. These results suggests this IPE module on oral care for cancer patients improved dental hygiene and nursing students' attitudes regarding IP communication and understanding of their roles as an oral health care provider.

Third hypothesis. To examine the hypothesis, "Can an IPE module on oral care for cancer help students develop an understanding of how IPE can enhance collaborative patient-centered care?"; an open-ended question in the RIPLS, noted in Table 7, provided anecdotal data on whether students value IPE and collaborative patient care. Additionally, a Wilcoxon-signed ranked test analyzed pre and post scores of RIPLS individual items seen in Table 8 as well as subscale scores in Table 6.

Table 7

Pre and Post Survey Open Ended Question

Questions: If you have any further comments regarding interprofessional education, please enter them in this box.

Pre-Survey Comments	Post-Survey Comments
Interprofessional education creates a more well-rounded clinician and nurse.	This class was very beneficial and helped me understand how important it is to address oral care during nursing patient care.
N/A	Thank you for your hard work and the wonderful snacks! Best to you as you finish your project.
	I learned a lot from this class. There is so much about dental care I wasn't aware of. This new knowledge will definitely benefit my nursing care.
	I (student nurse) learned very much (in a very small amount of time) from working as a team with other health care students (dental hygienists) that will help me improve my quality of care and help me focus on important aspects for patients in the future.
	This was an amazing class. I learned a lot about oral care that I did not know. This will help me provide better care for my patients.

Student comments related to the value of participation in the module as well as knowledge they will use in future patient care. Nursing students seemed to value the oral health information. There were 14 individual RIPLS items showing a significant difference in the pre and post scores and four RIPLS items without a significant difference as noted in Table 8.

The RIPLS subscales with significant differences included item numbers 1-9 representing attitudes about Teamwork and Collaboration subscale ($p=.002$); item numbers 10-12 representing Negative Professional Identity subscale ($p=.013$); items 13-16 Positive Professional identity subscale ($p=.001$);, and items 17-19 Roles and Responsibilities subscale ($p=.001$). See Table 6 and 8.

Table 8

Pre and Post Paired Wilcoxon Sign Test of Individual RIPLS Scores

	RIPLS Questions	Results
1	Learning with other students will help me become a more effective member of a health care team.	-3.143 ^b p=0.0028*
2	Patients would ultimately benefit if health care students worked together to solve patient problems.	-2.537 ^b p=.0118*
3	Shared learning with other health care students will increase my ability to understand clinical problems.	-2.111 ^b p=.035*
4	Learning with health care students before qualification would improve relationships after qualification (licensure).	-3.112 ^b p=.002*
5	Communications skills should be learned with other health care students.	-2.248 ^b p=.025*
6	Shared learning will help me to think positively about other professionals.	-2.700 ^b p=.007*
7	For small group learning to work together, students need to trust and respect each other.	-2.336 ^b p=.020*
8	Team-working skills are essential for all health care students to learn.	-1.567 ^b p=.117
9	Shared learning will help me to understand my own limitations.	-2.980 ^b p=.003*
10	I don't want to waste my time learning with other health care students.	-2.832 ^b p=.005*
11	It is not necessary for undergraduate health care students to learn together.	-2.873 ^b p=.004*
12	Clinical problem-solving skills are can only be learned with students from my own department.	-1.259 ^b p=.208
13	Shared learning with other health care students will help me to communicate better with patients and other professionals.	-3.176 ^b p=.001*
14	I would welcome the opportunity to work in small-group projects with other health care students.	-2.268 ^b p=.023*
15	Shared learning will help to clarify the nature of patient problems.	-2.725 ^b p=.006*
16	Shared learning before qualification will help me become a better team worker.	-2.435 ^b p=.015*
17	The function of nurses and therapists is mainly to provide support for doctors.	-.183 ^b p=.855
18	I'm not sure what my professional role will be.	-.279 ^b p=.780
19	I have to acquire much more knowledge and skills than other health care students.	-.196 ^b p=.845
	Z (^b Based on negative ranks.) Asymptotic Significance (2-tailed) <i>p</i> value * <i>p</i> <0.05	

The RIPLS Teamwork and Collaboration subscale evaluated participant's attitude regarding IP collaboration between students of different professionals including communication, trust, respect, and professional limitations. A high score suggests that students agree with these concepts. The highest possible score for Teamwork and Collaboration is 45. The participants pre-score were 39.3 and the post score was 42.2 demonstrating a population difference of 2.9 improvements. The pre-score was already high however participants indicated a slight improvement of their perception and attitudes regarding team works and collaboration. See Table 6.

The RIPLS Negative Professional Identity subscale evaluates attitudes of working with other allied health students. A high score would indicate that the student does not value cooperative learning with students of other health professionals. The potential score of 15 would indicate strong negative attitude toward cooperative learning. The participant's collective pre score was 5.5 and post score was 4.5 demonstrating a decreased negative attitude toward cooperative learning by one. The pre-score was already very low however students attitudes improved after the IPE module presentation. See Table 6.

The RIPLS Positive Professional Identity subscale relates to items regarding shared learning experiences with other health care profession students as improving communication, problem solving, and team skills. A high score of or near 20 would indicate that the student would value shared learning experiences to improve communication skills and provide quality patient support, and a clear understanding of professional identity. The collective pre-survey score of participants was 16.8 and the post-survey showed a score of 26.85, demonstrating a difference of 10. The participants

understanding of their professional identity improved after the module experience. See Table 6.

The RIPLS Roles and Responsibility subscale evaluates participant's attitudes regarding their professional roles as well as their perspective of other professional roles. A high score of 15 would indicate an unclear or a lack of understanding of their own professional role and the roles of other professionals. The collective pre-survey score was 7.1 and the post survey score was 33.98 demonstrating a difference of 26.85. This indicates these students' attitudes were improved regarding their own roles as a professional and the roles of other professional in collaborative patient care. See Table 6.

Anecdotal qualitative data from student comments support these statistics as noted in Table 7. Based on the statistical significance in RIPLS items and subscale scores as well as student comments the null hypothesis is rejected.

Discussion

Summary of Major Findings

Pre and post-test scores of the PI-designed multiple-choice survey demonstrated a significant difference in gained knowledge of participants regarding oral care for cancer patients. Participants demonstrated improvement in the post-test scores on all ten questions. Analysis of the open-ended question showed a positive response to the module content. The anecdotal data of students' comments demonstrated the participants in this study found the module on oral care for cancer patients helpful in increasing their understanding of oral cancer care for cancer patients. In this study, comparison of pre and post RIPLS scores suggests an improvement in participants' attitudes on IP collaboration and understanding of their professional roles.

Discussion

Interprofessional oral care for cancer patients. Results from this study suggest the implementation of an IPE module on oral care for the cancer patients improved dental hygiene and nursing students' knowledge of oral care for the cancer patient. The pre-module test results compared to the post-module test results and the open-ended response question provide evidence of student learning. The module content contained information necessary for participants to learn correct answers to the test questions. Although answers were provided in the module lesson, not all participants received a perfect score in the post-test. However, posttest scores significantly improved for all participants. In future implementation of this module, to provide additional learning for students, it may be

beneficial to provide the multiple-choice test items' correct answers, rationale for answers, or review the test after the post-test was completed. This review of content may potentially provide additional understanding and learning.

When evaluating student responses to the open-ended question, it appears participants who answered the question were nurses. All the responses were positive for learning and IP experience. The dental hygiene students did not write a response to the open-ended question. Three potential theories can be interpreted from these results. First, the current curriculum the nursing students are provided may not include this specific topic from a dental hygiene perspective. The instructors in the MHCC program have nursing or medical backgrounds but not dental. Second, having the topic of the module presented from an instructor with a dental hygiene background may have provided valuable insight for the nurses. Third, the lack of responses to the open-ended question from the dental hygiene students may be because they have had similar content in their curriculum and this topic may have been a review for them. The oncology nurse included in the module experience provided input on the handout sheets and some input during the module presentation. Stronger participation during the module delivery from an oncology nurse may create a more meaningful learning content for dental hygienists.

Interprofessional education can provide greater learning experiences when multiple professions come together to learn together (WHO, 2010). In addition to students of varied professions learning together, IPE experiences could be enhanced by having instructors of different professions teaching students of professions other than their own when topics or concepts overlap between professions. An example is dental hygiene instructors working with nursing students to provide oral health learning and

how to treat oral complication of cancer patients. The reverse would be true as well.

Having nursing instructors work with dental hygiene students to help them understand the process of cancer care and the precautions dental hygiene professionals need to be aware of when treating cancer patients may enhance dental hygiene students' learning within this topic. However, having the students from different professions together during the IPE learning experience provides a higher level of learning.

The IPE experience for dental hygiene and nursing students in the academic setting could be enhanced by developing opportunities for dental hygiene and nursing to be immersed in each other's clinical environment such as hospitals and the dental hygiene operatory. Having each profession cross over clinical boundaries could allow them to develop communication skills and an understanding of each other respective role.

Interprofessional education and communication. In this study, an IPE module on oral care for cancer patients improved dental hygiene and nursing students' communication skills and attitudes towards IP collaboration. Using PBL within IPE experiences with students is one strategy found to enhance students' communication skills and attitudes towards teamwork (Eccott, et al., 2012). The case study included in the module experience allowed participants to work in mixed groups of nurses and first year and second year dental hygiene students. During the case study assignment, students were asked to work together to formulate a treatment plan to address oral complications of a cancer patient from their professional perspectives. In this academic setting, students appeared interested in the case study and worked to help each student understand the content. In a study conducted by Eccott et al. (2012), participants identified their

perceived value of IPE case studies as the benefits of working together far outweigh the benefits of working alone.

Communication between the nursing and dental hygiene professions allowed for completion of case study assignments. The PI observed participants engaged in teamwork during this process. For example, the PI observed dental hygiene students teaching the nursing students the details of the radiographs provided in the case study. The dental hygiene students answered questions from the nursing students to help the nursing students understand components of the case study better. In addition, the PI observed nursing students not only asking questions but also providing valuable medical insight for the dental hygiene students regarding cancer care. Students working together to formulate treatment plans across professional boundaries experience a widening of their understanding of professional roles and value of collaboration (Eccott et al., 2012). Communication experiences in IPE within an academic setting may help students understand their role in patient care as well as other professional roles.

According to the pre and post individual RIPLS item as well as the RIPLS subscale Roles and Responsibilities scores, participants had a great improvement in their attitudes regarding their understanding of professional roles more so than other subscales. It was expected participants would not have a good understanding of their roles in cancer patient's oral care. These results suggest the curriculum content orients these students to their roles and responsibilities in providing care. More time and repeated IPE experiences may continue to enhance participants' understanding of their professional roles (Eccott et al., 2012 & Neville et al., 2013).

The students in the Eccott et al. (2010) study discussed the value of working in mixed groups and suggested that in order to work together, students need a base foundation of knowledge to be able to contribute to case study assignments. In this study, students were in small mixed groups that provided an atmosphere of participants' value the importance of the group with each participant contributing to discussion within the groups. The group members appeared to work well with each other. The outline of the case study was well organized but the group assignment was too extensive. Each group was assigned to provide treatment for all of the oral complications discussed in the module. The groups did not have sufficient time to work through the assignment and some groups did not have enough time to finish the assignment. In retrospect, group assignments should have required only working through the treatment plan for one of the oral complications. Assigning specific topics to each small group followed by a report of each group to the total cohort is good pedagogy and may provide better learning for all participants.

The IPEC core competencies in Domain 3, Interprofessional Communication, encompasses communication including expression of one's knowledge and opinions, listening, appropriate language, conflict resolution, positive relationships, and communicating to keep health care focused on patient-centered care. Problem-based learning experiences can facilitate the development of communication skills and learning to work as a team (Eccott et al., 2010 & IPEC, 2010). In this study, pre and post RIPLS scores demonstrated participants' attitudes regarding communication and teamwork. The participants demonstrated improvement in these areas following the module and case study experience. This result infers implementation of similar learning modules between

health care students have potential in curricular development to meet the Domain 3 IPEC competencies regarding communication.

Interprofessional education and student perception of roles on IP team. For these dental hygiene and nursing students, results suggest implementation of an IPE module on oral care for cancer patients improved attitudes and understanding of roles as an oral healthcare provider. In addition, for this cohort their perception of their own role on a cancer care team showed improved understanding.

The IPEC competencies in Domain 2, Roles and Responsibilities, includes the use of one's knowledge and the knowledge of other professionals to provide patient centered care. This domain includes understanding professional roles during patient care. During the module case study, participants used communication to express their ideas on how to treat the patient's oral complication. In addition, the students had to ask questions of each other to better understand patient's needs. As previously reported, the PI observed active communication between participants during the case study activity. Engagement between these students suggests through the communication process nursing and dental hygiene professions may complement each other resulting in enhanced patient centered care.

Pre and post RIPLS score for attitudes toward their understanding of professional roles demonstrated a significant difference. These results suggest several things; first, the program curriculum has provided these students with opportunities to learn about other professions; and second, these students have been exposed to the concept of professionalism. These premises were observed through the active participation of all students in the case study activity even though participants did not complete the MAGPIE treatment plan. This engagement between students could not have been

achieved without some understanding of their professional roles in the process of patient care.

The IPEC competencies Domain 2 Roles and Responsibilities (RR) were cross-referenced with the RIPLS items by the PI. The RIPLS items demonstrated an improvement in all areas except items 8, 12, 17, 18, and 19. This suggests the RIPLS may be used as an assessment tool for proving competency in Domain 2. The RIPLS item number 8 corresponds to the RR 7 competency of forging interdependent relationships with other professionals to improve care and advance learning. The case study in this study may need some reduction in the size of the assignment or small / large group pedagogy however; the RIPLS items 1, 2, 15, related to RR 7 did have an improved score. This would suggest participants did have some experience with improving attitudes of professional roles and a similar module design and implementation may assist others charged with developing curriculum to meet this IPEC Domain on roles and responsibilities.

The RIPLS Negative Professional Identity subscale evaluates attitudes of working with other allied health students. The RIPLS Positive Professional Identity subscale relates to items regarding shared learning experiences with other health care profession students as improving communication, problem solving, and team skills. In this study, participant's negative attitude decreased and their positive professional identity increased suggesting an IPE module may influence student attitudes about IPE. These improvements in attitudes suggest that IPE experiences can potentially help to prepare students to meet the needs of the allied health industry by breaking down professional boundaries or barriers that prevent professional collaboration in treating patients.

Interprofessional education and collaborative care. The implementation of this module suggests that an IPE module on oral care for cancer has potential to help students develop an understanding of collaborative patient-centered care. The module topic could be changed depending on curricular needs however, the data advocates the use of IPE experiences to share knowledge and assist team members to value roles and responsibilities of health care teams.

The RIPLS Teamwork and Collaboration subscale scores for students in this study had a small difference between pre and post. A high score is 45 and these participants' pre and post scores were 39.3 and 42.2 respectively suggesting these students have had some training in being team members and experience in collaborative patient care. Allied health professionals such as nursing and dental hygiene professionals may present with a service oriented disposition in that they bring with them a strong character to care for patient's needs. This may explain the high pre-score of the participants.

Limitations

This study was limited to a single institution because the PI is a part-time instructor providing a level of convenience to the study. Another neighboring institution was asked to participate and declined the opportunity. The nursing students had to fulfill an academic requirement encouraging them to participate that demonstrated to the students the study was important to the faculty. However, upon observation of student surveys it became apparent that not all nursing students were interested in taking part in the study. This may have affected the results of the data collect. Pre and post survey results from two nursing students suggest their attitudes were contrary to the purpose of

the study because they strongly disagreed or disagreed that there is no reason for interprofessional education. In addition, two nursing students gave the same Likert score to all 19 instruments in the RIPLS including the positive and negative items. In addition, four of the nursing student's PI-Designed multiple-choice test responses demonstrated random answers with little improvement in the pre and post survey.

The dental hygiene students' surveys as a whole appeared to demonstrate a more thoughtful process of reasoning and consistent improvement in attitude and responses although these students did not have an academic incentive for participating. Their cooperation in participation revealed an attitude of proactivity in the topic and support of the PI. However, not all dental hygiene students chose to participate. It appears, in this study, the intent and purpose for students participating may be an influential factor in the results of the statistical data collected.

Previous studies used a variety of time frames in which the IPE experiences were implemented (Eccott et al., 2012, Neville et al., 2013). This study was implemented in two hours. For students to be able to understand IPE and oral care for cancer patients one might conclude two hours is not enough time for students to fully understand the impact of IPE in caring for cancer patients with oral health complications. However, study results suggest using a short duration of time to implement a module on oral health for cancer patients demonstrate the potential for including IPE in nursing and dental hygiene curriculum in short periods and still have a positive impact.

The limited access to survey and statistical data software created imposing boundaries to the ability to collect and analyzed data such as the ability to look at specific student's pre and post survey scores. The data was compiled into a general collection of

data. It would have provided a greater understanding of the population if data could have been sorted and organized showing participants' individual scores and comparison of pre and post surveys and test. In addition, if the students knew they were identified through an assigned participant number they may have tried to provide a clearer representation of their IP understanding and attitudes.

Recommendations/Suggestions for Future Research

Future IPE research needs to be implemented to determine if student understanding of the value of IPE can be demonstrated in short term doses versus an academic term or year. Implementing IPE into health care programs may be able to occur more readily if the time necessary for students to comprehend the value of IPE was known.

The MAGPIE template was discussed in the literature review listing the components and purpose in using it for interdisciplinary learning experiences (Cahill et al., 2013). The PI attempted to find more information on how to implement this tool and train students on how to use it in an IPE experience. Little information was available to answer these questions. The use of the MAGPIE template and development of IPE module templates as well as additional literature on evaluation of learning may provide research consistency.

The oncology nurse that provided support to this project provided valuable input and helped to develop the handouts. Having a co-presenter and guests from both disciplines would help to strengthen the presentation and module content.

Lessons learned. The module presented to the study participants used the MAGPIE template designed specifically for IPE experiences. Because very little

information regarding the use and implementation of the MAGPIE template was available, it was difficult to provide participants adequate training on how to use it. Prior to the case study experience, the PI provided some training on how to use the MAGPIE template. The PI observed some individuals struggling with the concept of the MAGPIE template. The limited understanding of the template may have been a weakness in the student experience.

In addition, for the purpose of this study the MAGPIE template assisted students to determine a treatment plan for all the potential oral complications a cancer patient may exhibit as covered in the module presentation. Students had difficulty reporting all of the potential oral complications in their MAGPIE template and treatment plan during the time provided. For future studies, it may be more effective to have different groups work on a single oral complication rather than all of them. At the end of the treatment planning case study phase, students could share with other groups their plans to treat their assigned oral complications. Each group's case study template could be shared with all of the students.

During the case study, it would have been very helpful to have an instructor available for each of the groups to facilitate treatment-planning process. The instructors could have been trained on the study content as well as the use of the MAGPIE template. Having an instructor available to answer questions and facilitate communications would possibly help groups to fully understand the case study and complete the MAGPIE resulting in a thorough treatment plan.

Having an oncology nurse available for questions was very helpful. The nurse provided valuable insight to the study topic. The PI sought to include the nurse into the

presentation however; personal obligations of the nurse did not allow enough time for collaboration prior to the module. For future studies, having an oncology nurse involved throughout the module development and implementation, including the presentation may provide increased learning and value for participants.

The faculty that expressed a desire to participate was a potential factor in influencing students' level of participation. Faculty members were included in the module discussion and provided study support. They could have also influenced participants' responses because the instructors were present and observed students' level of participation.

Future IPE research. In global terms, IPE research needs to be considered in any area of patient care where professions and patient care cross over. Anywhere there is a need for collaboration between professionals to provide patient-centered care; research needs to be conducted to determine best options for teaching students how to communicate with other professionals to improve understanding. In this study within each curriculum, students were exposed to dental hygiene and nursing terminology. During the process of treatment planning, students had to explain terminology specific to their dental or medical field. Communication in developing care plans across professional boundaries is necessary to assist healthcare providers to understand field specific language. Providing IPE experiences specific to where professionals intersect in providing healthcare has potential to improve patient therapy outcomes.

Frameworks, templates, content, and assessment and evaluation tools need to be developed and tested to provide health education institutions mechanisms to design, implement, and evaluate IPE experiences. These frameworks can include learning

outcomes using the IPEC competencies and profession specific core competencies.

Online toolboxes could provide curriculum developers, administrators, and educators with open source evidence-based resources. This study could be a framework for those charged with providing content to health care professionals or students on holistic cancer care. See Figure 6.

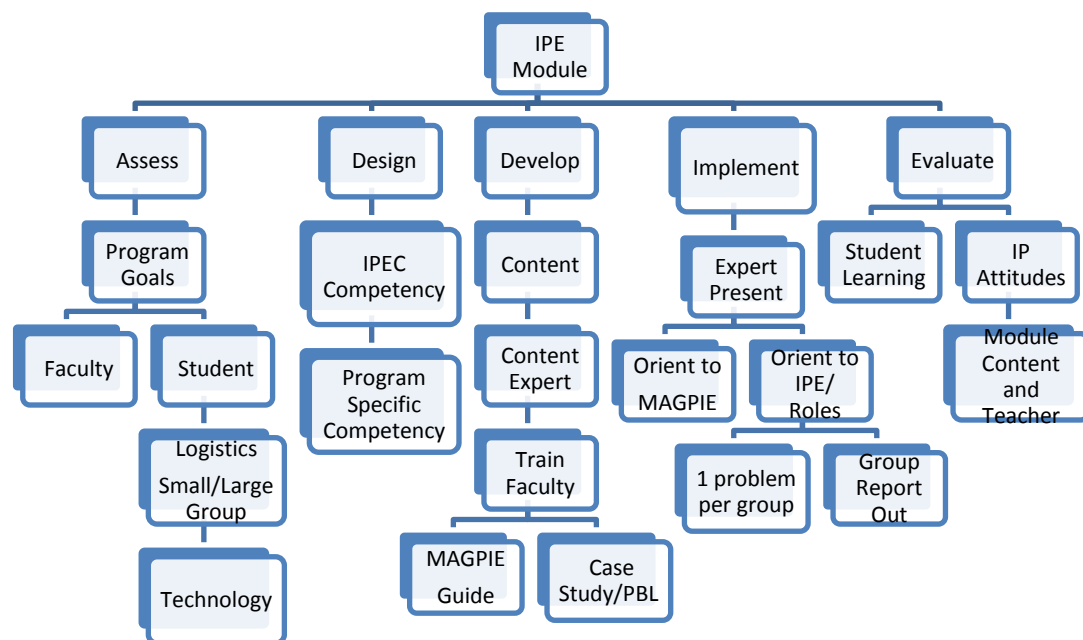


Figure 6 Framework for further research IPE Module

Conclusions

Interprofessional collaboration in cancer patient care provides a higher level of patient care. In order to achieve IP collaboration with cancer care teams, students must experience the concept in the learning institutions. In addition, instructors working together to develop cross over instruction using IPE could help to enhance IP experiences.

Previous research used multiple IPE exposure time lengths and each study demonstrated improved IPE outcomes (Eccott et al., 2012 & Neville et al., 2013). This study used a onetime event and found the participants experienced an improvement in attitudes and IPE understanding. This may suggest that all IPE experiences are beneficial whether in small and large doses. Curriculum changes can take time to implement however; adding IPE experiences within existing courses and lesson plans allows allied health programs to include IPE more expediently.

The RIPLS was used to evaluate this IPE experience and demonstrated it can be used for a single IPE experience that only lasted 2 hours. Additionally, use of a survey to evaluate student learning is recommended based on study results.

The topic of this study provided valued learning for dental hygiene and nursing students. Oral complication is a prominent health concern for cancer care. Dental hygiene and nursing students instructed together can help them develop communication skills across professional boundaries and understand their roles within cancer care team.

It is clear IPE has the potential to improve student attitudes and learning regarding oral care for cancer patients. Improving cancer patients' oral care while they are undergoing cancer treatment can decrease cost of care and improve treatment outcomes.

References

- Adamson, K. A., & Kardong-Edgren, S. (2012). A method and resources for assessing the reliability of simulation evaluation instruments. *Nursing Education Perspectives*, 33(5), 334-339.
- Anderson, L., Meraw, S., Al-Hezaimi, K., & Wang, H. L. (2013). The influence of radiation therapy on dental implantology. *Implant Dentistry*, 22(1), 31-38. doi:10.1097/ID.0b013e31827e84ee; 10.1097/ID.0b013e31827e84ee
- Bainbridge, D., Brazil, K., Krueger, P., Ploeg, J., Taniguchi, A., & Darnay, J. (2011). Evaluating program integration and the rise in collaboration: Case study of a palliative care network. *Journal of Palliative Care*, 27(4), 270-278.
- Bainbridge, D., Seow, H., Sussman, J., Pond, G., Martelli-Reid, L., Herbert, C., & Evans, W. (2011). Multidisciplinary health care professionals' perceptions of the use and utility of a symptom assessment system for oncology patients. *Journal of Oncology Practice / American Society of Clinical Oncology*, 7(1), 19-23. doi: 10.1200/JOP.2010.000015; 10.1200/JOP.2010.000015
- Bell, K.P., Phillips, C., Paquette, D.W., Offenbacher, S., Wilder, R.S. (2011). Dental Hygienists' Knowledge and Opinions of Oral-Systemic Connections: Implications for Education. *Journal of Dental Education*. 76(6), 682-694.
- Bleakley, A., Allard, J., & Hobbs, A. (2012). Towards culture change in the operating theatre: Embedding a complex educational intervention to improve teamwork climate. *Medical Teacher*, 34(9), e635-40. doi:10.3109/0142159X.2012.687484; 10.3109/0142159X.2012.687484

- Cahill, M., O'Donnell, M., Warren, A., Taylor, A., & Gowan, O. (2013). Enhancing interprofessional student practice through a case-based model. *Journal of Interprofessional Care*, doi:10.3109/13561820.2013.764514
- Chambers M. S., Garden, A. S., Martin, J. W., Kies, M. S., Weber, R. S., & Lemon, J. C. (2009). Chapter 35: Oral and orofacial considerations in oncology. *Medical Care of Cancer Patients*, 307-319.
- Doucet, S., Buchanan, J., Cole, T., & McCoy, C. (2013). A team approach to an undergraduate interprofessional communication course. *Journal of Interprofessional Care*, 27(3), 272-273.
- Dow, A. W., Diazgranados, D., Mazmanian, P. E., & Retchin, S. M. (2013). Applying organizational science to health care: A framework for collaborative practice. *Academic Medicine: Journal of the Association of American Medical Colleges*, doi:10.1097/ACM.0b013e31829523d1
- Eccott, L., Greig, A., Hall, W., Lee, M., Newton, C., & Wood, V. (2012). Evaluating students' perceptions of an interprofessional problem-based pilot learning project. *Journal of Allied Health*, 41(4), 185-189.
- Fook, J., D'Avray, L., Norrie, C., Psoinos, M., Lamb, B., & Ross, F. (2013). Taking the long view: Exploring the development of interprofessional education. *Journal of Interprofessional Care*, doi:10.3109/13561820.2012.759911
- Gilbert, J.H.V. (2012). Interprofessional – education, learning, practice, and care. *Journal of Interprofessional Care*. 27(4), 283-285. doi: 10.3109/13561820.2012.755807
- Hanyok, L. A., Walton-Moss, B., Tanner, E., Stewart, R. W., & Becker, K. (2013). Effects of a graduate-level interprofessional education program on adult nurse

practitioner student and internal medicine resident physician attitudes towards interprofessional care. *Journal of Interprofessional Care*, doi:10.3109/13561820.2013.790881

Hertweck, M.L., Hawkins, S.R., Bednarek, M.L., Goreszny, A.J., Schreiber, J.L., Sterrett, S.E. (2012). Attitudes Toward Interprofessional Education: Comparing Physician Assistant and Other Health Care Professions Students. *The Journal of Physician Assistant Education*, 23(2), 8-15.

Hosny, S., Kamel, M. H., El-Wazir, Y., & Gilbert, J. (2013). Integrating interprofessional education in community-based learning activities: Case study. *Medical Teacher*, 35 Suppl 1, S68-73. doi:10.3109/0142159X.2013.765550; 10.3109/0142159X.2013.765550

Interprofessional Education Collaborative. (2011). *Core Competencies for Interprofessional collaborative Practice: Report of an Expert Panel*. Retrieved June 16, 2013 from <http://www.aacn.nche.edu/education-resources/ipcreport.pdf>

Inuwa, I. M. (2012). Interprofessional education (IPE) activity amongst health sciences students at sultan qaboos university: The time is now! *Sultan Qaboos University Medical Journal*, 12(4), 435-441.

Jacobs, J. L., Samarasekera, D. D., Chui, W. K., Chan, S. Y., Wong, L. L., Liaw, S. Y., . . . Chan, S. (2013). Building a successful platform for interprofessional education for health professions in an Asian university. *Medical Teacher*, 35(5), 343-347. doi:10.3109/0142159X.2013.775414; 10.3109/0142159X.2013.775414

Kligler, B., Homel, P., Harrison, L. B., Levenson, H. D., Kenney, J. B., & Merrell, W.

- (2011). Cost savings in inpatient oncology through an integrative medicine approach. *The American Journal of Managed Care*, 17(12), 779-784.
- Konradsen, H., Trosborg, I., Christenson, L., & Pedersen, P.U. (2012) Oral Status and the need for oral health care among patients hospitalized with acute medical conditions. *Journal of Clinical Nursing*, 21(2), 2851-2859.
- Lam, A. Y., Plein, J. B., Hudgins, G., & Stratton, M. A. (2013). Silos to systems: Three models for developing geriatric interprofessional education. *The Consultant Pharmacist: The Journal of the American Society of Consultant Pharmacists*, 28(2), 122-133. doi:10.4140/TCP.n.2013.122; 10.4140/TCP.n.2013.122
- Lambertz, C. K., Gruell, J., Robenstein, V., Mueller-Funaiole, V., Cummings, K., & Knapp, V. (2010). NO STOPS: Reducing treatment breaks during chemo-radiation for head and neck cancer. *Clinical Journal of Oncology Nursing*, 14(5), 585-593.
- Mackenzie, D., & Merritt, B. K. (2013). Making space: Integrating meaningful interprofessional experiences into an existing curriculum. *Journal of Interprofessional Care*, 27(3), 274-276. doi:10.3109/13561820.2012.751900; 10.3109/13561820.2012.751900
- Manne, D. S., Giarelli, E., & Throckmorton, T. A. (2003). Oncology nurse and dental hygienist: Finding success at the crossroad of two professions. *Oncology Nursing Forum*, 30(6), 913-915. doi: 10.1188/03.ONF.913-915
- Migliorati, C., Hewson, I., Lalla, R. V., Antunes, H. S., Estilo, C. L., Hodgson, B., . . . Mucositis Study Group of the Multinational Association of Supportive Care in Cancer/International Society of Oral Oncology (MASCC/ISOO). (2013).

Mount Hood Community College: Associate of Applied Science Degree Dental Hygiene

guide Fall 2014, Retrieved November 11, 2013 at

<http://www.mhcc.edu/docs/LimitedRestricted/DHGuide.pdf>

NEXUSIPE. (2013). Readiness for Interprofessional Learning Survey retrieved from

<http://nexusipe.org/resource-exchange/ripls-readiness-interprofessional-learning-scale>

NLNAC. (2013). Accreditation Manual 03: Standards and Criteria Retrieved from

http://www.nlnac.org/Manual%20&%20IG/2003Edition/Manual_III.pdf

Neville, C. C., Petro, R., Mitchell, G. K., & Brady, S. (2013). Team decision making:

Design, implementation and evaluation of an interprofessional education activity for undergraduate health science students. *Journal of Interprofessional Care*,

doi:10.3109/13561820.2013.784731

Packard, K., Hardeep, C., Maio, A., Doll, J., Furze, J., Huggett, K., Jensen, G., Jorgensen,

D., Wilken, M., Qi, Y. (2012). Interprofessional Team Reasoning Framework as a Tool for Case Study Analysis with Health Professional Students: A Randomized Study. *Journal of Research in Interprofessional Practice and Education*. 2(3), 250-263.

Pullon, S., McKinlay, E., Beckingsale, L., Perry, M., Darlow, B., Gray, B., . . . Morgan,

S. (2013). Interprofessional education for physiotherapy, medical and dietetics students: A pilot program. *Journal of Primary Health Care*, 5(1), 52-58.

Reeves, S., Perrier, L., Goldman, J., Freeth, D., & Zwarenstein, M. (2013).

Interprofessional education: Effects on professional practice and healthcare outcomes (update). *Cochrane Database of Systematic Reviews (Online)*, 3,

CD002213. doi:10.1002/14651858.CD002213.pub3;

10.1002/14651858.CD002213.pub3

Ross, A. J., Anderson, J. E., Kodate, N., Thomas, L., Thompson, K., Thomas, B., . . .

Jaye, P. (2013). Simulation training for improving the quality of care for older people: An independent evaluation of an innovative program for inter-professional education. *BMJ Quality & Safety*, 22(6), 495-505. doi:10.1136/bmjqs-2012-000954; 10.1136/bmjqs-2012-000954

Sussman, J., Barbera, L., Bainbridge, D., Howell, D., Yang, J., Husain, A., . . . Walker,

H. (2012). Health system characteristics of quality care delivery: A comparative case study examination of palliative care for cancer patients in four regions in Ontario, Canada. *Palliative Medicine*, 26(4), 322-335. doi: 10.1177/0269216311416697; 10.1177/0269216311416697

Sussman, J., Howell, D., Bainbridge, D., Brazil, K., Pyette, N., Abbasi, S., & Whelan, T.

(2011). The impact of specialized oncology nursing on patient supportive care outcomes. *Journal of Psychosocial Oncology*, 29(3), 286-307. doi: 10.1080/07347332.2011.563342; 10.1080/07347332.2011.563342

Tullmann, D. F., Shilling, A. M., Goeke, L. H., Wright, E. B., & Littlewood, K. E.

(2013). Recreating simulation scenarios for interprofessional education: An example of educational interprofessional practice. *Journal of Interprofessional Care*, doi:10.3109/13561820.2013.790880

Turner, L., Mupparapu, M., & Akintoye, S. O. (2013). Review of the complications associated with treatment of oropharyngeal cancer: A guide for the dental

practitioner. *Quintessence International (Berlin, Germany : 1985)*, 44(3), 267-279.

doi: 10.3290/j.qi.a29050; 10.3290/j.qi.a29050

Wårdh, I., Paulsson, G., & Fridlund, B. (2009). Nursing staff's understanding of oral health care for patients with cancer diagnoses: An intervention study. *Journal of Clinical Nursing*, 18(6), 799-806.

Wilhelmsson, M., Svensson, A., Timpka, T., & Faresjo, T. (2013). Nurses' views of interprofessional education and collaboration: A comparative study of recent graduates from three universities. *Journal of Interprofessional Care*, 27(2), 155-160.

doi:10.3109/13561820.2012.711787; 10.3109/13561820.2012.711787

World Health Organization. (2010). *Framework for Action on Interprofessional Education and Collaborative Practice*. Department of Human Resources for Health. Retrieved June 16, 2013, from

http://www.who.int/hrh/nursing_midwifery/en/

Wolff, K. D., Follmann, M., & Nast, A. (2012). The diagnosis and treatment of oral cavity cancer. *Deutsches Arzteblatt International*, 109(48), 829-835.

doi:10.3238/arztebl.2012.0829; 10.3238/arztebl.2012.0829

*Appendix A***Dental Hygiene and Nursing Students Demographic Survey**
Please complete the following questionnaire.

Group Color/Number _____ Participants Number _____

1. ☐ Nursing Student ☐ Dental Hygiene Student (check one)
2. ☐ First Year ☐ Second Year (check one)
3. Gender: ☐ Female ☐ Male
4. Age _____
5. Ethnicity (check one)
 - ☐ Caucasian
 - ☐ African American
 - ☐ Asian American/Pacific Islander
 - ☐ Hispanic
 - ☐ American Indian/Alaskan Native
 - ☐ Other

*Appendix B***Readiness for Interprofessional Learning Scale (RIPLS) Questionnaire**

The purpose of this questionnaire is to examine the attitude of health care students toward interprofessional learning.

	Please complete the following questionnaire.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1	Learning with other students will help me become a more effective member of a health care team.	5	4	3	2	1
2	Patients would ultimately benefit if health care students worked together to solve patient problems.	5	4	3	2	1
3	Shared learning with other health care students will increase my ability to understand clinical problems.	5	4	3	2	1
4	Learning with health care students before qualification would improve relationships after qualification (licensure).	5	4	3	2	1
5	Communications skills should be learned with other health care students.	5	4	3	2	1
6	Shared learning will help me to think positively about other professionals.	5	4	3	2	1
7	For small group learning to work together, students need to trust and respect each other.	5	4	3	2	1
8	Team-working skills are essential for all health care students to learn.	5	4	3	2	1
9	Shared learning will help me to understand my own limitations.	5	4	3	2	1
10	I don't want to waste my time learning with other health care students.	5	4	3	2	1
	It is not necessary for undergraduate health care students					

11	to learn together.	5	4	3	2	1
12	Clinical problem-solving skills are can only be learned with students from my own department.	5	4	3	2	1
13	Shared learning with other health care students will help me to communicate better with patients and other professionals.	5	4	3	2	1
14	I would welcome the opportunity to work in small-group projects with other health care students.	5	4	3	2	1
15	Shared learning will help to clarify the nature of patient problems.	5	4	3	2	1
16	Shared learning before qualification will help me become a better team worker.	5	4	3	2	1
17	The function of nurses and therapists is mainly to provide support for doctors.	5	4	3	2	1
18	I'm not sure what my professional role will be.	5	4	3	2	1
19	I have to acquire much more knowledge and skills than other health care students.	5	4	3	2	1

If you have any further comments regarding interprofessional education please enter them in the box below

1. Parsell, G., & Bligh, J., (1999). The development of a questionnaire to assess the readiness of health care students for interprofessional learning (RIPLS). Medical Education. 33(2). 95-100.

*Appendix C***PI Designed Multiple-Choice Survey on the module and case study**

<p>Please answer the following 10 multiple-choice questions by circling the letter for the correct answer.</p>
<p>1. Which of the following statements best describe interprofessional collaborative practice?</p> <ul style="list-style-type: none"> a. when individual professionals selectively determine when they should work together to provide patient care. b. when two or more professions work collaboratively communicating and interacting between disciplines to achieve mutual goals for patient centered care. c. when professionals work together providing patient centered care at the request of the patient d. when patients needs are greater than the ability of a healthcare provider, the professional seeks additional professional advice.
<p>2. Patient centered care can be described as:</p> <ul style="list-style-type: none"> a. occurring when patients request additional services b. occurring when professionals determine patient's needs require multiple providers c. occurs when a team of health care and social care providers work together keeping the patients' needs at the center of their goals. d. occurs when patient request consultation with multiple providers
<p>3. Which oral health complication occurs most often when patients that is being treated for cancer and is responsible for most treatment breaks?</p> <ul style="list-style-type: none"> a. loss of taste b. xerostomia c. tooth decay d. oral mucositis
<p>4. The term "interprofessional" can be interchanged with and means the same as:</p> <ul style="list-style-type: none"> a. interdisciplinary b. interstitial c. interdependent d. internal network
<p>5. All of the following are potential consequences of cancer treatment that patient's may be faced with during treatment EXCEPT:</p>

<ul style="list-style-type: none">a. increased cost of careb. stopping of treatmentc. uneventful or no oral side affectsd. decreased quality of life
<p>6. Radiation and Chemotherapy almost always results in some form of oral complications.</p> <ul style="list-style-type: none">a. Trueb. False
<p>7. Cancer of the head and neck region is the sixth leading cancer site with what percentage of a survival rate over a 5 year period.</p> <ul style="list-style-type: none">a. 20%b. 30%c. 40%d. 50%
<p>8. The potential roles that a dental hygienists and oncology nurse may play in the treatment of cancer patients can be termed respectively as:</p> <ul style="list-style-type: none">a. external; internalb. internal; externalc. primary; secondaryd. secondary; primary
<p>9. Approximately 70-80 % of healthcare errors are caused by human errors associated with what?</p> <ul style="list-style-type: none">a. improper record keeping of patient treatmentb. health care providers not following through with patient carec. lack of understanding of patient centered cared. poor communication and misunderstanding between health care providers
<p>10. It is best practice to take measures to prevent oral complication and/or treat them early when they occur rather than wait for them to decrease patient's quality of life.</p> <ul style="list-style-type: none">a. True

b. False

If you have any further comments regarding interprofessional education please enter them in the box below

Parsell, G., & Bligh, J. (1999). The development of a questionnaire to assess the readiness of health care students for interprofessional learning (RIPLS). *Medical Education*. 33(2). 95-100.

*Appendix D***RIPLS Terms of Use****Measurement Instrument Terms of Use****Readiness for Interprofessional Learning Scale (RIPLS) Questionnaire****Permission Statement from Angus K McFadyen****(via email communication, August 26, 2013)**

These instructions are provided by the National Center for Interprofessional Practice and Education as part of a curated collection of instruments used for interprofessional education and collaborative practice (IPECP) research. More information is available at nexusipe.org/measurement-instruments.

The instrument is in the public domain. Permission not really required and there has never been a license issue with our versions of RIPLS.

The logo for akm-stats, with 'akm' in black and 'stats' in orange.

Dr Angus K McFadyen

Statistical Consultant

email: akm@akm-stats.com

www.akm-stats.com

Appendix E

Eastern Washington University IRB Proposal and Signature

Institutional Review Board for Human Subjects Research

Application for Exemption

Return original and two copies to: Grants Office, 210 Showalter

Principal Investigator/Title/Department /Address/Phone/email Shaun Christenson, RDH, BSDH Graduate Student Dental Hygiene Department 519 NW 209 th Street Ridgefield, WA 98642 360-609-0243 Schristenson2010@eagles.ewu.edu	Responsible Project Investigator/Department/Phone/email (faculty or staff supervisor required if PI is a student) Ann O'Kelley Wetmore, RDH, MSDH Assistant Professor EWU Dental Hygiene Department 301 N Riverpoint Box E Spokane, WA 99202 509-328-1321 awetmore@ewu.edu
Title of Project <p style="text-align: center;">Interprofessional Education and Collaboration in Dental Hygiene and Nursing</p>	
For students only: Is this research being done to meet a course, thesis or other academic requirement? (please specify) If not, why is it being done? Yes, this research is for thesis credit completion for DNHV600.	
Project anticipated starting date: April 21, 2014 Anticipated termination date: April 21, 2015	
Funding: Non-funded: <u>X</u> Internal funding: <u>N/A</u> External funding: <u>N/A</u> Funding status: proposal in preparation: <u>N/A</u> pending agency decision: <u>N/A</u> funded: <u>N/A</u> Funding Agency (if applicable): <u>N/A</u>	
Check the type of exemption applicable to the project 1. <u> </u> 2. <u>X</u> 3. <u> </u> 4. <u> </u> 5. <u> </u> 6. <u> </u> None <u> </u>	
Why should this project be considered exempt? This study will use Survey Monkey to administer anonymous surveys. Surveys could be considered for IRB Exempt status because they do not disrupt or manipulate subjects' normal life experiences and will not incorporate any form of intrusive procedures.	
Please state the purpose and methodology of the research: <p>This study will use a quasi-experimental design with a convenience sample of allied health students surveyed before and after an interprofessional learning experience. Teams of nursing and first and second year dental hygiene students will be organized into small homogenous groups of seven or eight nine members and provided a case study educational module for treating cancer patients. The module will use a problem based case study that will include decision making, critical thinking, and reflective learning experiences. Each IPE team will develop treatment options and determine best practice on how to provide comprehensive patient-centered care. Interprofessional Education Collaborative (IPEC) core competencies will be incorporated within the training, student lesson plan, and assessment tools. The competency domains that will be focused on include Roles/Responsibilities for Collaborative Practice and Interprofessional Communication (IPEC, 2011).</p> <p>The study will seek to determine if the implementation of an IPE module on oral care for the cancer patient (1) improves students' knowledge of oral care for the cancer patient, (2) improves student's communication skills and perception of their own role on a cancer care team, and (3) helps students develop an understanding of how IPE can enhance collaborative patient-centered care?</p> <p>All students will complete a demographic survey. See Attachment A. Prior to and upon completion of module, students will complete a pre and post survey using the Readiness for Interprofessional Learning Scale (RIPLS) to determine student's level of understanding for teamwork and collaboration, negative and positive professional identity, and roles and responsibilities (NEUSIPE). In addition to the RIPLS survey an additional PI-designed Module Likert-type survey will be included to determine module learning outcomes. See Attachment B.</p>	
Describe the procedures: what specifically will subjects do? If data are anonymous, describe the data gathering procedure for insuring anonymity. <p>Because the PI is a graduate student at Eastern Washington University (EWU), the Institutional Review Board (IRB) for Eastern Washington University (EWU) must be informed of this study. The PI has submitted an IRB proposal to Mt Hood Community College IRB because the subjects will be MHC students.</p>	

rev. 3/31/06

The PI is an adjunct professor in the Dental Hygiene Program at Mount Hood Community College (MHCC), and has access to allied health students. Therefore, a convenience sample will be obtained by enlisting volunteer nursing and dental hygiene students enrolled in their respective programs at MHCC.

Stage 1 Communicate with Faculty. The PI will communicate with MHCC dental hygiene and nursing faculty to set up a meeting with dental hygiene and nursing students to introduce the study and obtain consent for their voluntary participation. The Mount Hood Community College nursing and dental hygiene programs require a community service component to their program. Participation in this study will help students meet their respective programs requirements. The PI will ask permission to use an email distribution list of all dental hygiene and nursing students from each respective program. The PI will then arrange a classroom for this meeting and email all potential student participants using student email lists and the blind carbon copy (bcc) feature for sending email in order to maintain email privacy.

5. INFORMED CONSENT PROCESS:

Stage 2 Study Informational Meeting. At the arranged meeting time and place the PI will present a short PowerPoint® presentation on the proposed study to all students attending. In addition, the PI will provide a letter to each student explaining the study, their role, and the PI's credentials. This letter from the PI will inform them of their voluntary status, the benefits of participating in the study including documentation of research participation on their professional resumes.

The PI will assure them there will be no negative effects if they choose not to participate. The PI will advise all students of how study results will be published and data collected to assure confidentiality. In addition, the PI will provide contact information to the students for herself, her thesis advisor, and the EWU IRB. Subsequently, they will be provided an opportunity to ask questions of and have them answered by the PI.

Students will then be asked to read and sign a consent form giving permission for study enrollment which includes participation in a module on oral health for cancer patients and collection of pre and post survey scores. Each student enrollee will receive a copy of the signed consent form for their personal records.

The PI will inform students of the prearranged time for the module implementation. Each student will receive a snack at the completion of the informational meeting. All student data will be kept confidential in a locked drawer at the PI's personal residence.

PROCEDURES: The PI is cognizant of the importance of time for both students as well as faculty and will try to adhere to the proposed times for each stage of study implementation.

Stage 3 Module Preparation. Prior to module implementation the PI will send email reminders to students and faculty. In an attempt to enroll all students the PI will be available to any students who missed the information meeting to explain the study and obtain consent following the same protocol as described in Stage 2. The PI will verify classroom availability and equipment systems.

In an attempt to determine learning outcomes, students will be placed into homogenous allied health teams. These groups will consist of two first year students and two second year students from the dental hygiene program and four to five senior nursing students from the nursing program which will result in six groups of seven ($n=7$) and three groups of eight students ($n=8$). The PI will use class lists from nursing and dental hygiene and cross reference with subject's signed consent forms to assure subject consent. All enrolled subjects will be sorted into first year dental hygiene, second year dental hygiene, senior nursing, and junior nursing respectively. The PI will then randomly draw two first year dental hygiene students and two second year dental hygiene students and three or four nursing students for Group A and continue this process until all subjects are assigned to a team.

Each team will have a colored name tag and each student's name tag which corresponds with their team will be in a manila envelope they will receive at module implementation. The PI will review the Oral Cancer Care module and do a run through to assure a timely implementation and evidence-based content. Depending on the agreed upon time for module implementation the PI will arrange for snacks for all participants.

Stage 4 Student Orientation. On the arranged date for the module implementation the PI will present a short 5 minute PowerPoint® presentation outlining the study events including pretest, module implementation, case study small group work, and posttest. Students will have an opportunity to clarify any concerns they have regarding the module implementation. Students will be briefed on the problem based case study enhanced with a modified simulated experience which will be aligned with a real life situation.

Stage 5 Module Pre-test. The PI will gather demographic data and administer the pre-test RIPLS and PI-designed multiple choice survey via Survey Monkey. The PI anticipates this stage to take 5-10 minutes.

Stage 6 Presentation of Module Content. Upon collection of all pretest surveys, the PI will present the module content to the students. Topics on oral cancer care will include: prevalence of cancer, oral complications that may occur with cancer care, implications of cancer treatment stops, and overview of potential oral complication treatments. The module presentation will take about 25 minutes.

Stage 7 Case Study. After the PI presents the module content and answers any questions, the

The information provided above is accurate and the project will be conducted in accordance with applicable Federal, State and University regulations and ethical standards.

Signature, Principal Investigator(s) Sharon Christensen Date 4-7-14

Recommendations and Action

Faculty Sponsor (for student) Ann O'Kellegher Date 4-7-2014 Approve/Disapprove approve

Dept IRB Representative or Dept Chair Renee Stof 4-8-14 approve

Institutional Review Board _____

Conditions: _____ Approved from _____ To _____

Exemption Decision Aid

Research Qualifying for Exemption from Federal Regulations for the Protection of Human Subjects (Quoted from the Code of Federal Regulations, Title 45, Part 46.101(b)(1-6))

- (1). Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or on the comparison among instructional techniques, curricula, or classroom management methods.
- (2). Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior, unless: (i) information obtained is recorded in such a manner that the human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.
- (3). Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) requires without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
- (4). Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.
- (5). Research and demonstration projects which are conducted by or subject to the approval of the department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.
- (6). Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level of and for a use found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

Based on both federal policy and/or University policy, exempt status may not be granted for research in the preceding six categories if any of the following conditions applies (except for certain exemptions for children):

- | Yes | No |
|--------------------------|---|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If any of the subjects are confined in a correctional or detention facility. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If pregnancy is a prerequisite for serving as a subject. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If fetuses <i>in utero</i> are subjects in this research. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If any subjects are presumed not to be legally competent. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If personal records (medical, academic, etc.) are used without written consent. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If data from subjects (responses, information, specimens, etc.) are directly or indirectly identifiable. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If data are damaging to subjects' financial standing, employability or reputation |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If material obtained at autopsy is to be used in the research. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If subjects are to be asked sensitive questions about personal feelings, behavior, interactions, or sexual experiences. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If alcohol or any other drugs will be ingested. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If blood or body fluids will be drawn. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> If any of the subjects are children as defined by state law.* |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> Will the child participate in a survey? |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> Will the child be interviewed? |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> Will the investigator manipulate the environment or interact with the child as part of the data gathering? |

*Appendix F***Mount Hood Community College IRB Proposal and Signature**

For Office Use Only: <u>4/21/14</u>	IRB Case No: _____
Date Reviewed: _____	IRB Reviewer: <u>[Signature]</u>
Action: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Exempt <input type="checkbox"/> Not Approved	

**Mt. Hood Community College
INSTITUTIONAL REVIEW BOARD (IRB)
APPLICATION FOR THE CONDUCT OF RESEARCH
INVOLVING HUMAN SUBJECTS**

The Mt. Hood Community College IRB reviews all requests to conduct research involving human subjects. It is the Investigator's responsibility to give complete information regarding procedures and the informed consent process. If the principal investigator is a student, the application must be approved and signed by the applicant's faculty sponsor and the Dean of the faculty's division.

After completing the application and obtaining required signatures, one original of the application and all supporting materials must be forwarded to the **MHCC IRB, Office of Instruction and Student Services, 26000 SE Stark Street, Gresham, Oregon 97030**. The IRB will notify each applicant of the IRB's decision. If you have questions, please contact the IRB at 503-491-7295.

The Principal Investigator must supply the required documentation listed below:

- ☒ A copy of all questionnaires or survey instruments
- ☒ Informed consent document(s) or minor assent document(s)
- ☒ Letters of approval from cooperating institutions (if appropriate)
- ☒ All required signatures

Please type or print responses.

PROJECT TITLE: Interprofessional Education and Collaboration in Dental Hygiene and Nursing

1. Principal Investigator's Name Shaun Christenson

(If more than one principal investigator, provide supplementary page with contact information.)

Department Dental Hygiene Phone 360-609-0243

Mailing Address 519 NW 209th Street, Ridgefield, WA 98642

Email Schristenson2010@eagles.ewu.edu

Faculty Sponsor Ann O'Kelley Wetmore Phone 509-828-1321

Department/Institution Eastern Washington University Dental Hygiene

Email awetmore@ewu.edu

Is this a class project? yes ☒ no ☐ Thesis? yes ☒ no ☐ Other _____

2. Project Start Date: April 21, 2014 Project End Date: April 21, 2015

3. Is a proposal for external support being submitted? yes no ☒

Agency or Sponsor: _____ Deadline: _____

If yes, you must submit one complete copy of the proposal with this application.

- a. Is this a continuation of a MHCC IRB project? yes ☐ no ☒

If yes, previous IRB case number: _____

4. PROJECT DESCRIPTION: This study will use a quasi-experimental design with a convenience sample of allied health students' surveyed before and after an interprofessional learning experience. Teams of nursing and first and second year dental hygiene students will be organized into small homogenous groups of seven or eight nine members and provided a case study educational module for treating cancer patients. The module will use a problem based case study that will include decision making, critical thinking, and reflective learning experiences. Each IPE team will develop treatment options and determine best practice on how to provide comprehensive patient-centered care. Interprofessional Education Collaborative (IPEC) core competencies will be incorporated within the training, student lesson plan, and assessment tools. The competency domains that will be focused on include Roles/Responsibilities for Collaborative Practice and Interprofessional Communication (IPEC, 2011).

The study will seek to determine if the implementation of an IPE module on oral care for the cancer patient (1) improves students' knowledge of oral care for the cancer patient, (2) improves student's communication skills and perception of their own role on a cancer care team, and (3) helps students develop an understanding of how IPE can enhance collaborative patient-centered care?

All students will complete a demographic survey. See Attachment A. Prior to and upon completion of module, students will complete a pre and post survey using the Readiness for Interprofessional Learning Scale (RIPLS) to determine student's level of understanding for teamwork and collaboration, negative and positive professional identity, and roles and responsibilities (NEUSIPE). In addition to the RIPLS survey an additional PI-designed Module Likert-type survey will be included to determine module learning outcomes. See Attachment B.

5. SUBJECT SELECTION:

Will subjects be less than 18 years of age? Yes ☐ No ☒

Age range of subjects From 19 To 99

Will subjects be students at MHCC? Yes ☒ No ☐

How many subjects will participate? 50-80

How will subjects be selected, enlisted or recruited?

The PI is an adjunct professor in the Dental Hygiene Program at Mount Hood Community College (MHCC), and has access to allied health students. Therefore, a convenience sample will be obtained by enlisting volunteer nursing and dental hygiene students enrolled in their respective programs at MHCC.

Stage 1 Communicate with Faculty. The PI will communicate with MHCC dental hygiene and nursing faculty to set up a meeting with dental

hygiene and nursing students to introduce the study and obtain consent for their voluntary participation. The Mount Hood Community College nursing and dental hygiene programs require a community service component to their program. Participation in this study will help students meet their respective programs requirements. The PI will ask permission to use an email distribution list of all dental hygiene and nursing students from each respective program. The PI will then arrange a classroom for this meeting and email all potential student participants using student email lists and the blind carbon copy (bcc) feature for sending email in order to maintain email privacy.

6. INFORMED CONSENT PROCESS:

Stage 2 Study Informational Meeting. At the arranged meeting time and place the PI will present a short PowerPoint® presentation on the proposed study to all students attending. In addition, the PI will provide a letter to each student explaining the study, their role, and the PI's credentials. This letter from the PI will inform them of their voluntary status, the benefits of participating in the study including documentation of research participation on their professional resumes. The PI will assure them there will be no negative effects if they choose not to participate. The PI will advise all students of how study results will be published and data collected to assure confidentiality. In addition, the PI will provide contact information to the students for herself, her thesis advisor, and the EWU IRB. Subsequently, they will be provided an opportunity to ask questions of and have them answered by the PI.

Students will then be asked to read and sign a consent form giving permission for study enrollment which includes participation in a module on oral health for cancer patients and collection of pre and post survey scores. Each student enrollee will receive a copy of the signed consent form for their personal records.

The PI will inform students of the prearranged time for the module implementation. Each student will receive a snack at the completion of the informational meeting. All student data will be kept confidential in a locked drawer at the PI's personal residence.

PROCEDURES: The PI is cognizant of the importance of time for both students as well as faculty and will try to adhere to the proposed times for each stage of study implementation.

Stage 3 Module Preparation. Prior to module implementation the PI will send email reminders to students and faculty. In an attempt to enroll all students the PI will be available to any students who missed the information meeting to explain the study and obtain consent following the same protocol as described in Stage 2. The PI will verify classroom availability and equipment systems.

In an attempt to determine learning outcomes, students will be placed into homogenous allied health teams. These groups will consist of two first year students and two second year students from the dental hygiene program and four to five senior nursing students from the nursing program which will result in six groups of seven ($n=7$) and three groups of eight students ($n=8$). The PI will use class lists from nursing and dental hygiene and cross reference with consent forms to assure subject consent. All enrolled subjects will be sorted into first year dental hygiene, second year dental hygiene, senior nursing, and junior nursing respectively. The PI will then randomly draw two first year dental hygiene students and two second year dental hygiene students and three or four nursing students for Group A and continue this process until all subjects are assigned to a team.

Each team will have a colored name tag and each student's name tag which corresponds with their team will be in a manila envelope they will receive at module implementation. The PI will review the Oral Cancer Care module and do a run through to assure a timely implementation and evidence-based content. Depending on the agreed upon time for module implementation the PI will arrange for snacks for all participants.

Stage 4 Student Orientation. On the arranged date for the module implementation the PI will present a short 5 minute PowerPoint® presentation outlining the study events including pretest, module implementation, case study small group work, and posttest. Students will have an opportunity to clarify any concerns they have regarding the module implementation. Students will be briefed on the problem based case study enhanced with a modified simulated experience which will be aligned with a real life situation.

Stage 5 Module Pre-test. The PI will gather demographic data and administer the pre-test RIPLS and PI-designed multiple choice survey via Survey Monkey. The PI anticipates this stage to take 5-10 minutes.

Stage 6 Presentation of Module Content. Upon collection of all pretest surveys, the PI will present the module content to the students. Topics on oral cancer care will include: prevalence of cancer, oral complications that may occur with cancer care, implications of cancer treatment stops, and overview of potential oral complication treatments. The module presentation will take about 25 minutes.

Stage 7 Case Study. After the PI presents the module content and answers any questions, the participants will find their pre-assigned groups based on their name tag colors. The PI will provide basic training on how to use an IPE case-based teaching model referred to as the meet, assess, goal set, plan, implement, and evaluate model (MAGPIE). The MAGPIE model is an interdisciplinary case management process. The six stages of the model are defined in Figure 5.

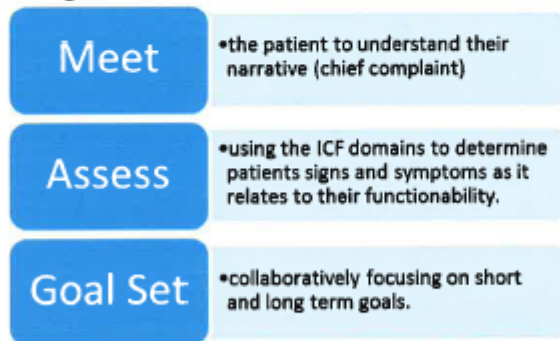




Figure 5 The MAGPIE process, a method for case based teaching and learning. (Cahill, O'Donnell, Warren, Taylor, & Gowan, 2013)

Each team will receive a template with the MAGPIE model to assist them in developing a patient care plan. They will be given 40 minutes to work collaboratively and formulate their plan. The PI will then lead a 5-10 minute debriefing session on the case study.

Stage 8 Post Test. After the module case study debriefing, the PI will administer the post-test RIPLS and PI-designed multiple choice survey via a second Survey Monkey link. Each student will receive a snack after completing their posttest surveys which should take about 5-7 minutes.

7. CONFIDENTIALITY AND ANONYMITY:

Survey Monkey respondent data will be anonymous and all data will be emailed to the PI in encrypted formats to the PI's password-protected account. Copies of student consent form and team paperwork will be kept at the PI's residence in a lock filing cabinet. All electronic study data will be kept in a password protected computer that is only accessed by the PI.

8. RISKS:

This study is minimal risk. There are no known or anticipated risks to subjects. Any potential risks from this study would not be any different from those risks encountered in daily life.

BENEFITS:

The anticipated benefit of this study is all participants will have the opportunity to participate in an IPE learning experience. Students who choose to participate in this study also have the opportunity to document research participation on their professional resumes. The anticipated benefit to society is the possibility of better patient care resulting from an understanding of the importance of collaboration in providing cancer care.

RESPONSIBILITIES OF THE PRINCIPAL INVESTIGATOR:

- Any additions or changes in procedures in the protocol will be submitted to the IRB for written approval prior to these changes being put into practice.
- Any problems connected with the use of human subjects once the project has begun, must be brought to the attention of the IRB.
- The principal investigator and his or her designee are responsible for retaining Informed Consent Documents for a period of three years after the completion of the project.

The principal investigator may not initiate any research involving human subjects until written notification of IRB approval or compliance with any and all contingencies made in connection with said approval has been received. Failure to provide all required information will result in return of your IRB application for correction prior to IRB review.

SIGNATURES: *I certify to the best of my knowledge the information presented is an accurate reflection of the proposed research project and that I intend to comply with the guidelines set forth by MHCC Institutional Review Board's Conduct of Research Involving Human Subjects.*

A. Shawn Christensen 4-7-2014
Principal Investigator (required) Date

B. Approval by faculty sponsor (required for all students):

I confirm the accuracy of this application, and I accept responsibility for the conduct of this research, the supervision of human subjects, and maintenance of informed consent documentation as required by the IRB.

Ann O'Kelley Weber 4-7-2014
Faculty Sponsor Date

C. Approval by Vice President of Instruction and Student Services (required):

I approve of the procedures that involve human subjects.

Christie Blum 4/20/14
Vice President Date

Appendix G

Participants Invitation Letter



Page 1 of 1

Dear Dental Hygiene and Nursing Students,

My name is Shaun Christenson, and I am currently a Master of Science in Dental Hygiene student with Eastern Washington University (EWU). I am working with my thesis chair, Professor Ann O'Kelley Wetmore, Dental Hygiene Assistant Professor/Director of EWU on my thesis implementation which is part of my graduation requirements. My topic is "Interprofessional Education and Collaboration in Dental Hygiene and Nursing". My thesis specifically focuses on dental hygiene and nursing students working together in treating cancer patients addressing oral health and potential oral health complications which may occur during cancer treatment. I would like to invite you to participate in this study. The results of this study could positively impact cancer patient care and improve participants understanding of their role in cancer patient care.

The implementation of my thesis study will include a 2 hour informative instruction covering oral complications that may occur during cancer treatment and what health care providers can do as a team to address oral health needs of cancer patients. Participants will gain an understanding of what interprofessional practice is, how to use it, and how to facilitate interprofessional communication keeping patients at the center of treatment. Participants will learn how valuable their role is as a partner in patient centered care.

Participants will be asked to fill out a brief demographic survey and pre and post surveys via Survey Monkey, participate in module discussions, and participate as a team member on a case study activity. Each participant will be given a certificate of completion to add to their resume. Light refreshments and drinks will be provided.

Participation in this study is voluntary and the decision to not participate will in no way affect students grades or academic status. The data collected from this study will be kept confidential and only the research team will have access to the information. If you have any questions regarding this research study, please contact me at VSHH@aol.com or Professor Ann O'Kelley Wetmore at awetmore@ewu.edu. If you choose to participate or would like to find out more regarding this project, you are invited to attend an informative meeting to obtain additional study information and consent form.

With sincere gratitude,
Shaun Christenson, RDH, BSDH

*Appendix H***Participants Consent Form****Consent Form**

Title: Interprofessional Education and Collaboration in Dental Hygiene and Nursing

Principle Investigator and Co-Investigator's Names

Shaun Christenson, RDH, BSDH
Graduate Student
Dental Hygiene Department
Eastern Washington University
University
519 NW 209th Street
E
Ridgefield, WA 98642
360-609-0243
Schristenson2010@eagles.ewu.edu

Ann O'Kelley Wetmore,
Assistant Professor;
Dental Hygiene Department
Eastern Washington

310 N Riverpoint Blvd. Box

Spokane, WA 99217
509-828-1321
awetmore@ewu.edu

Purpose and Benefits

The purpose of this proposed study is to determine effective interprofessional (IPE) teaching models for allied healthcare teams that include dental hygiene and nursing students. The study will seek to determine if there are benefits for interprofessional allied student healthcare teams specifically working with cancer patient care. Comprehensive health care requires collaboration of health professionals. Whether or not healthcare providers view themselves as a healthcare team, each cancer patient depends on the performance of the healthcare providers as a whole. Cancer patients experience barriers to their treatment when their oral health declines resulting in their inability to eat. Dental hygienists are oral health care specialists who can provide support for cancer patients and be a valuable member of a cancer care team. Nurses are the frontline care providers for cancer patients. Evidence demonstrates when healthcare workers learn to work collaboratively resources are better utilized: community and populations are serviced more effectively (WHO, 2010). It is clear that IPE can develop healthcare workers who are better prepared to support patient care.

Procedures

If you choose to participate in this study, you will consent for the following data you have completed and/or will complete to be used in this research study:

- Your Readiness for Interprofessional Learning Scale (RIPLS) and PI-designed multiple choice survey scores from pre and post assessment. It is important to provide the best answers on these surveys so valid research data may be gathered.
- Your self-reported demographic data including your age, ethnicity, gender, major program, and year in program.

BENEFITS

The anticipated benefit of this study is all participants will have the opportunity to participate in an IPE learning experience. Students who choose to participate in this study also have the opportunity to document research participation on their professional resumes. The anticipated benefit to society is the possibility of better patient care resulting from an understanding of the importance of collaboration in providing cancer care.

RISKS

This study is minimal risk. Any potential risks from this study would not be any different from those risks encountered in daily life.

OTHER INFORMATION

Your participation in this research is VOLUNTARY. There will be no consequences or retaliation for your decision not to participate in the study. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time without prejudice. You will not be personally identified in any reports or publications that may result from this study. Only the Principal Investigator and her Faculty Supervisor, Ann O'Kelley Wetmore, will know your identity. All your information will be kept confidential and neither your name nor any other information that could identify you will be revealed in this study. Any personal information about you that is gathered during this study will remain confidential to every extent of the law. A special number (or code) will be used to identify you in the study and only the principal investigator will know your name. There are no costs to the participant.

QUESTIONS:

Shaun Christenson will be glad to answer any questions regarding the study at any time and may be reached at 360-609-0243 or email Schristenson2010@eagles.ewu.edu

Signature of Principle Investigator

Date

The study described about has been explained to me, and I voluntarily consent to participate in this study. I have had an opportunity to ask questions about this study. I understand that by signing this form I am not waiving my legal rights. I understand that if I decide to take part in this research study, a copy of this signed consent form will be given to me.

Signature of Subject

Date

If you have any concerns about your rights as a participant in this research or any complaints you wish to make, you may contact Ruth Galm, Human Protection Administrator, (509-359-6567), rgalm@ewu.edu

*Appendix I***Assignment of Groups**

Group	First Year DH students	Second Year DH students	Senior Nursing Students	(n) for each group
A	2	2	5	(n=9)
B	2	2	5	(n=9)
C	2	2	5	(n=9)
D	2	2	5	(n=9)
E	2	2	4	(n=8)
F	2	2	4	(n=8)
G	2	2	4	(n=8)
H	2	2	4	(n=8)
I	2	2	4	(n=8)
	36 DH Students		40 Nursing Students	N=76

*Appendix J***IPE CASE STUDY**

NEW PATIENT - Kelly Newby AGE: 50 GENDER: Female HEIGHT: 5' 2" WEIGHT: 120 lbs.		VITAL SIGNS BLOOD PRESSURE: 113/62 mm Hg PULSE RATE: 72 bpm RESPIRATION: 18 rpm	
1. Under the care of physician: YES Condition: rheumatoid arthritis 2. Hospitalized with in the last 5 years: YES Reason: shoulder injury 3. Has or had the following conditions syncope; hormonal replacement therapy; tetracycline allergic response 4. Current medications <ul style="list-style-type: none"> • Acetaminophen (Tylenol) – nonnarcotic analgesic • Diclofenac (Voltaren) – nonsteroidal anti-inflammatory • Diltiazem HCL (Cardizem) – calcium channel blocker • Antagonist antianginal • Estradiol and norethindrone (CombiPatch) – estrogen and progestin combination 5. Smokes or uses tobacco products: NO 6. Is pregnant: NO		MEDICAL HISTORY: although not currently taking nitroglycerin, she does keep a prescription for this drug. DENTAL HISTORY: Has been 5 years since last dental appointment. She had a stressful experience and did not want to return to the same office. She experiences hot and cold sensitivity and uses sensitivity toothpaste although she reports that it does not seem to help that much with her molar teeth. She brushes 2 x a day and flosses 2-3 x a week. Has a lower partial but has not been wearing it lately because it does not fit well. SOCIAL HISTORY: Although she was left financially secure when she lost her husband a year ago she works outside her home to cope with her loss and add structure and stimulation to her life. CHIEF COMPLAINT: Hot and cold sensitivity especially in the molar areas. She has concerns of the lower right tenderness and noted slight swelling. She is also concerned about not being able to chew well due to the loss of molar teeth and her partial not fitting well. CURRENT ORAL HYGIENE STATUS: Meticulous home care using a fluoridated sensitivity toothpaste, floss, and fluoride rinse at night. Slight calculus present on the lingual surfaces of the mandibular anterior teeth, gen slight to moderate recession, general slight proximal plaque SUPPLEMENTAL ORAL EXAMINATION FINDINGS: Class 1 mobility on lower left molar	
TREATMENT COMPLETED AND NOTES: <ul style="list-style-type: none"> • Comprehensive Exam • Periodontal Charting • EO/IO cancer screening, noted mandibular left ridge appears slightly swollen and tender; left and right submandibular glands are slightly swollen • Full Mouth Dental Radiographs (upon discovery of potential lesion on lower right periapical film, a Panorex radiograph was prescribed) • Prophylaxis (Class II) although she has pocketing, she has very little sub, patient educated on proper home care and periodontal status: recommend 6 month recall 		REFERRAL to oral surgeon to biopsy lesion discovered on panorex x-ray. BIOPSY DX: Osteosarcoma (malignant	

4. During this patients year-long cancer treatment provide a guideline to the dental hygienist and patient when they can provide routine oral prophylaxis?

--

5. What kind of dental treatment is needed for this patient prior to her cancer treatment?

--

6. What are the roles of the dental hygienists and the nursing prior to, during and after cancer treatment?

NURSE

[illegible]

*Appendix K***Module Lesson Plan**

**IPE Module: Patient-Centered Cancer Care
For Dental Hygiene and Nursing Students**

Learning Outcomes

On completion of this module the learner will be expected to be able to:

- Define interprofessional collaborative practice
- Discuss nursing and dental hygiene role in collaborative cancer patient care
- Identify individual professional role in cancer patient care
- Demonstrate respectful communicative skills during collaborative patient care discussion
- Apply teamwork and conflict management skills toward patient treatment plan
- Define oral health complication cancer patients may acquire during treatment
- Discuss treatment options for oral complication of cancer patient
- Apply cancer patient care understanding to case study applicable to patient care
- Demonstrate patient centered care in treatment planning

Teaching Methods/Strategy:**Learning**

Knowledge of IPE and cancer patient oral care

Skills: Communication & team work

Activities: communication & teamwork, role play; case study project.

Teaching methods

Lecture with PowerPoint covering IPE, cancer oral care, communication, teamwork, and

professional roles in cancer patient care

Tutorials: training on IP collaboration, oral care for cancer patient, training on use of

MAGPIE to develop treatment plan, case study training

Learning Activities

Active classroom discussion through lecture, video of patient experience

PBL Case Study of cancer patient care using MAGPIE model.

Group Discussion following case study to include debriefing

Resources

Handouts

- Outline of course lecture, “Appendix A”
- Case study packet, “Appendix B”
- MAGPIE Work Sheet, “Appendix C”
- Oncology patient hand out “Appendix D”
- Article by Suzanne Moore, M.C. Burk, M, R, Fenion, and A. Banerjee, “The role of the general dental practitioner in managing the oral care of head and neck oncology patients”.

PowerPoint visuals with lesson plan information, patient interview video and professional perspective

Assessments for Student Learning Outcomes:

Learning Outcomes		Teaching Strategy	Learner Activity	Assessing for Learning
Knowledge	Define interprofessional collaborative practice	Lecture PowerPoint Discussion	Reproduce learning linking concepts	Active discussion and case study; learning survey
Knowledge	Discuss nursing and dental hygiene role in collaborative cancer patient care	Lecture PowerPoint Discussion	Case Study; linking concepts through case study and discussions	Active discussion and case study; learning survey
Explore Learning	Identify individual professional role in cancer patient treatment	Team Discussion	Interpret knowledge	Active discussion and case study; learning survey
Explore learning	Demonstrate respectful	Teamwork and discussion	Providing multiple	Active discussion and case study;

	communicative skills during collaborative patient care discussion		perspectives through discussion;	learning survey
Apply learning	Apply teamwork and communication skills toward patient treatment plan	Teamwork and discussion with question and answers	Apply theory through practice enhancing understanding	Group case study project
Apply learning	Define oral health complication cancer patients may acquire during treatment	Lecture PowerPoint Discussion	Connect and clarify knowledge	Active discussion and case study; learning survey
Apply learning	Discuss treatment options for oral complication of cancer patient	Problem solving; case study group work	Apply concepts then transform knowledge	Group case study project
Apply learning	Apply cancer patient care understanding to case study applicable to patient care	Problem solving; case study groups work	Synthesis and transform knowledge	Group case study project
Application of new skill	Demonstrate patient centered care in treatment planning	Presentation and group discussion of case study treatment plans	Transform knowledge	Discussion and presentation of case study

Lesson Plan Outline

(Slide 1) Pre-Module Survey Instructions

(Slide 2) Title Page

- Introduction: welcome participants, introduce myself, and thank everyone for coming.
- Becky (Oncology Nurse) introduce herself

(Slide 3) Study Outline: explain module and study content and structure. GO OVER PACKET CONTENTS

- Pre-test (5 minutes)
- Instruction on IP collaboration (10 minute)
- Oral care for cancer patient (30 minutes)
- MAGPIE introduction (10 minutes)
- Case study instructions (10 minutes)
- Case study group work (40 minutes)
- Case study debriefing (10 minutes)
- Post-test and snacks served (5 minutes)
- Drawing for prizes

QUESTIONS

(Slide 4) Define IP

- Prefix “inter” from the Latin term refers to “among, between”
- The term “professional” refers to being engaged in a specific activity as a paid occupation
- When combined with education as in IPE, the term refers to learning activities that take place between professionals regardless of their legal or education status
- The term interprofessional can be interexchange with the term interdisciplinary; they mean the same however for this module we will use IPE

(Slide 5) Interprofessional Education

- The World Health Organization (WHO) is calling for a collaborative work force
- For interprofessional collaboration to take place it is necessary for interprofessional education to occur.
- The WHO has stated, “How can they work together if they don’t learn together”?
- Currently the world is facing a shortage of healthcare workers. Healthcare administrators and policy makers are working to develop effective strategies that can bridge the gap between patient needs and available resources (WHO, 2010). Interprofessional education is one of the needed strategies.
- In current healthcare settings, professionals must be able to collaboratively work within a team of providers to provide best patient centered care (WHO, 2010).

(Slide 6) Benefits of IP occur....

- When two or more individuals work together towards a common goal
- Resources are better utilized, community populations are serviced more effectively

- A team of healthcare professionals can provide effective, comprehensive, and reliable patient care (Eccott et al., 2013).
- An example of this is easily demonstrated when you have a natural disaster. In the event of a natural disaster, the red-cross is brought in to assess the situation. Upon evaluation of the needs of the population, resources are sought and can include first aide and medical teams, industrial equipment such as cranes, police personnel for crowd control, media for communication, social workers or counseling professionals, and community leaders who understand demographics of the population. The list can go on and on.

(Slide 7) In academics the current Academic trends....

- Provide instruction for allied health students learning in a traditionally segregated setting.
- Many healthcare systems throughout the world are fractured and fragmented making it difficult to meet the needs of the populations.
- It is possible that because of the segregated learning traditions allied healthcare providers continue this tradition of segregated health care into the work place.

(Slide 8) Define Patient centered care

- The Institute of Medicine defines patient-centered care as: "Providing care that is respectful of and responsive to individual patient preferences, needs, values, and ensuring that patient values guide all clinical decisions."
- Patient-centered care is also one of the overreaching goals of healthcare advocacy in addition to safer medical systems and greater patient involvement in healthcare delivery and design.
- Patient-centered care can only be truly patient-centered when active patient engagement at every level of treatment and care are offered.

**(Slide 9) Communication: Discuss and role play of collaboration concepts:
communication
& teamwork**

- Communication skills are necessary for comprehensive conversations regarding patient care (Eccott et al., 2013; WHO, 2010).
- It is estimated that approximately 70-80 % of healthcare errors are caused by human errors associated with poor communication and misunderstanding between healthcare providers.
- About 50% of the errors could be avoided through team-based communication.

- Improving the quality of clinical collaboration has been shown to result in fewer errors and patient mortality (Bleakley, Allard, & Hobbs, 2012).

Communication role play activity: find a partner. “You will spend 30 seconds getting to know your partner on a professional level. Your goal is to develop a professional report’ that will allow you to engage in further communications regarding patient care.”

(Slide 10) What did you find out about your partner? Let’s do a self-assessment of your role play activity.

(Slide 11) Teamwork

- Effective care for patients with chronic conditions is most often achieved when healthcare providers work together to complement their skills to meet patient’s multifaceted healthcare needs (Pullon, McKinlay, Bechingsale, Meredith, Darlow, Gray, Gallagher, Hoare, & Morgan, 2013).
- The more complex the patient’s needs, the more important collaborative healthcare is required.
- Professional collaboration is not limited to just healthcare providers. An example may be a social worker realizing that a patient may need help with transportation to appointments or connection to a builder in the community that can build a wheel chair ramp.

(Slide 12) IPC can improve a professional’s understanding of their professional boundaries and scope of practice.

- A common barrier in collaborative patient care can be when individual team members do not recognize their individual purpose and roles as a contributing member of a healthcare team.
- Key components to effective interprofessional collaboration includes respectful communication, professionalism, shared problem-solving, decision-making, and conflict resolution (Tullmann et al., 2013)
- A break in communication and a lack of commitment to teamwork is toxic and dangerous within the context of patient care.

(Slide 13) Cancer Patient title page

- We will next discuss topics that cancer patients may be faced with during their cancer treatment and options that you as a healthcare provider can do to provide patient support.

(Slide 14) Cancer Patient Facts

- Approximately 470,000 new cases of cancer are diagnosed annually (Wolff, Follmann, & Nast, 2012).
- It is estimated that oral cancer constitutes about 40,250 of the new cancer cases each year (Anderson, Meraw, Al-Hizaimi, & Wang, 2013).
- Cancer of the head and neck region is the sixth leading cancer site with only a 50% survival rate over a 5 year period (Anderson et al., 2013; Turner, Mupparapu, & Akintoye, 2013).
- All types of cancer treatment may predispose patients to oral complications (Wolff et al., 2012; Migliorati, Hewson, Lalla, Antunes, Estilo, & Hodgson)

(Slide 15) Roles of nurses during patient cancer care...

- Are to manage overall treatment of patient including clinical support; these responsibilities are diverse and often complex
- The oral health of patients is often over looked or receives low priority because patients cancer treatment needs are often potentially life threatening placing oral health low on the priority list
- The most singular function of nurses is to improve the human condition.
- Their role in patient care is as diverse and extensive as their education
- If a nurse decides to specialize in a specific area such as pediatrics, oncology, or any other medical specialty, additional education and training is often necessary.
- An Oncology nurse provides multiple healthcare related services for cancer patients (Manne et al., 2003). They are expected to provide care and case management, indirect and direct patient care, and clinical support. They have the knowledge and understanding of treatment procedures and goals of the prescribed treatment.
- Even with their extensive knowledge of cancer treatment and procedures, many nurses believe that they face a barrier in diagnosis and management of oral complication that can occur during cancer treatment (Manne et al., 2003).
- Oral symptoms, diagnosis, management, and treatment are reported as being significantly important in patient cancer care however it also presents as a challenging responsibility of oncology nurses (Manne et al., 2003).

(Slide 16) Roles of dental hygienists

- Oral health is reflective of total body health and vice versa
- Dental Hygienists are specialist trained to address oral soft tissue and oral health

- They focus on prevention and can identify risk factors associated with the lack of oral health
- Their education includes understanding and treating a variety of oral complications
- Dental hygienists administer therapies to treat oral disease as well as educate patients about the connection between oral health or the lack of oral health and overall health.
- In the dental setting they are often the first person to review the medical history and can screen for cancer risks due to an understanding of high risk factors.
- Dental hygienists perform intra-oral and extra oral cancer screening as part of their treatment regimen.
- The dental hygienist has sufficient oral health knowledge making them not only oral health specialists but beneficial contributing members to a healthcare team (CODA, 2013).

(Slide 17) A Collaborative Oncology Team including nurses and dental hygienists...

- Have the job of reducing oral side effects of radiation and chemotherapy treatments
- Together they are required to address all of the patients side effects of cancer treatment as well as oral complications
- As a team they can focus on decreasing the incidence of cancer patients stopping treatment because of oral complications
- Professionals brought together to communicate across professional boundaries can assist healthcare providers to better understand treatment procedures and patient's needs thus providing comprehensive patient-centered care.
- Proactively addressing and treating pain and side effects of cancer treatment of oncology patients requires the involvement of multidisciplinary providers (Bainbridge, Seow, Sussman, Pond, Martellis-Reid, Herbert, & Evans, 2011).
- Cancer care teams can include oncologists, osteopathic, homeopathic, social care, variety of nursing staff, pharmacist, physical therapist, and general supportive staff.
- There are many different types of cancer and patients enter cancer treatment at different stages of their cancer.
- Patients with cancer have significant burden of symptoms that can include high stress, fatigue, anxiety, depression, and additional side effects such as oral complications.
- Studies indicate that interprofessional collaboration rarely occurs with the oncology team and the oral health team (Bell et al., 2011; Manne et al., 2003).

- When communication does occur healthcare providers do not often understand the treatment modalities the respective professions provide. This lack of knowledge about healthcare team members may create uncertainties in treatment considerations as well as knowing what questions to ask of each other (Bell et al., 2011; Manne, 2003).

(Slide 18) Role of nursing and dental hygiene team

- Within an IP team there are multiple health care professionals who provide ongoing patient care with varying degrees of responsibilities. The leaders and followers in the IP team can provide complimentary roles and their roles may shift depending on the requirements of patient care (Dow, DiazGranados, Mazmanian, Retchin, 2013).
- An example of varying roles of leaders can be demonstrated by discussing two potential leadership roles that a nurse and a dental hygienist may engage in during cancer patient care.
- Two forms of leaders: an internal and an external leader. An internal leader such as a nurse has knowledge of patient's clinical treatment and the team members contributing abilities. An internal nurse would be directly involved in patient's ongoing care.
- An external leader such as a dental hygienist would be considered a consultant in determining treatment of conditions that a cancer patient may exhibit during their cancer treatment as well as determining ways to prevent oral complications. The value of an external leader is that the person can provide fresh ideas and treatment options directly related to their professional expertise benefiting patient care and treatment outcomes (Dow et al., 2013).

(Slide 19) Oral complications of cancer patients

- Undergoing treatment for cancer is very stressful so it is reasonable that cancer patient's oral health concerns are minimal. Studies have proven that people with poor oral health often suffer with other maladies. Individuals that have optimal oral health tend to have fewer health complications including decreased oral health concerns.
- Cancer treatments range from radiation, chemo-therapy, surgery, or a combination of these (Ben-Arye, 2010).
- Treatment choices can lead to a variety of oral complications.
- Oral complications that affect patients receiving cancer treatment can lower quality of life, increase cost of care, and decrease patient's ability to eat (Ben-

Arye, 2010; Kligler, Homel, Harrison, Levenson, Kenney, & Merrell, 2012; Wardh, Paulsson, & Fridlund, 2009; Wolff et al., 2012).

- Some oral complications and side effects include: mucositis, candidiasis, or oral infections, osteoradionecrosis, xerostomia, and radiation caries (Ben-Arye, 2010; Wolff et al, 2012).

(Slide 20) Importance of Oral Care video

(Slide 21) Oral mucositis: description, oral complications

- Mucositis is the most common oral side effect of chemotherapy cancer treatment and most often overlooked until it adversely affects patients quality of life
- It begins 5-10 days after the initiation of chemotherapy and lasts 7-14 days.
- Mucositis affects approximately 80% of cancer patients
- It is defined as ulceration or a breakdown of the epithelial cells resulting in painful lesion which can affect the lining of the entire GI tract leaving the mucosal tissues open to ulceration and infection. The mucosal tissue that lines the mouth is the most sensitive parts of the body and particularly vulnerable to chemotherapy and radiation.
- The exposed nerve ending make eating or even talking a painful task
- Exhibits as oral pain, erythema, difficulty in opening the mouth, difficulty in performing oral care regimens difficulty eating, drinking, and speaking, feeling of dryness, mild burning, or pain when eating food
- Signs and symptoms: red, shiny, or swollen mucosal tissue and gums, blood in the mouth
- Soft-whitish patches or pus in the mouth or on the tongue
- Increased mucus or thicker saliva in the mouth
- Factors that increase incidence and severity are poor oral or dental health, ill-fitting dentures, smoking, chewing tobacco, and drinking alcohol
- Females appear to be more likely than males to develop mucositis
- Influencing factors from cancer treatment include dehydration, low body mass index, dry mouth
- Diseases such as kidney disease, diabetes or HIV/AIDS and previous cancer treatment increase incidence of mucositis as well as increased severity.

(Slide 22) Oral Mucositis treatment options from dental and nursing team

Dental Hygiene

- Prevention is best treatment

- Dentures need to be well fitted, restorations need to be in good repair, optimal oral health regimen, oral prophylaxis; all dental work completed one month prior to cancer treatment
- Mouth rinses used to remove debris and keeping mouth moist and clean
- Avoid alcohol and irritating foods such as spicy or citric, hot, acidic or coarse foods
- Chlorhexidine without alcohol can be used to prevent oral infections however do not use chlorhexidine in patients with solid tumors of the head and neck who are undergoing radiotherapy. .
- If oral sores start to exhibit, oral cleanliness is important along with adequate hydration

Nurse

- There are 5 main approaches to managing oral mucositis
- Oral debridement with mucolytic agents such as Alkalol which helps dislodge dried secretions
- Oral decontamination, including antibacterial and antifungal rinses
- Topical and systemic pain management such as 2% viscous lidocaine, magic mouthwash preparations, and topical morphine solution: an oral rinse containing doxepin also appears to be effective against pain related to oral mucositis
- Swishing and gargling the anesthetic gel viscous Xylocaine 2% can help you eat if you have pain in your mouth, pharynx or esophagus. Use 1 tsp. (5 mL) viscous Xylocaine before meals. (Hold in mouth for one minute, then spit out.) This may increase your ability to eat by mouth while the anesthetic effects are working
- Benadry® elixir, lozenges and analgesics may help reduce mouth pain
- Cepacol Lozenges, Chloraseptic spray and lozenges, or the use of tea (particularly chamomile) for swishing and gargling may be of some help.
- Prophylaxis such as ice-chip cryotherapy which was developed by nurses. Patients sucking on ice chips during chemotherapy treatment experience fewer mucositis incidence possibly due to the ice temperatures constricting oral blood flow
- Palifermin (keratinocyte growth factor), and antiviral medications have been approved for protection against mucositis
- One of the issues of using topical agents is the inability to effectively coat all areas and that the pain relief may be brief. In patients with mucositis who do not achieve pain relief with topical agents, narcotic analgesia is often necessary.

(Slide 23) Oral infections, candidiasis, herpetic lesions

Dental Hygiene

- Candidiasis is typically caused by opportunistic overgrowth of *C. albicans*, a normal inhabitant of the oral cavity in large proportions of individuals.
- Candida infections of the mouth and throat are uncommon among healthy individuals

Nurse

- Viral infection varies in their severity and extent of infection. Viral infections can be minimal or life threatening. Prevention and prompt therapy is important however guidelines are limited once viral infection is diagnosed.

(Slide 24) Oral infection treatment options from dental and nursing teams**Dental Hygiene**

- Good oral hygiene practices help to prevent oral infections in people with weakened immune systems
- Chlorhexidine mouth wash can help prevent oral candidiasis in people undergoing cancer however should be without alcohol.
- Patients who wear dentures should remove them prior to oral antifungal agent use. Dentures can be treated by soaking them overnight in the antifungal solution.

Nurse

- Topical oral antifungal agents such as Nystatin rinse and Clotrimazole troches are often used.
- For persistent fungal infection, systemic agents should be used.

(Slide 25) Osteoradionecrosis

- Osteoradionecrosis is a major complication of surgery or trauma in previously irradiated bone in the absence of tumor persistence.
- Radiation-induced vascular insufficiency rather than infection causes bone death. It occurs most commonly in the mandible after head and neck irradiation.

Nurse

- Risk factors include the total radiation dose, modality of treatment, fraction size and dose rate, oral hygiene, timing of tooth extractions as well as the continued use of tobacco and alcohol.
- This condition is often painful, debilitating, and may result in significant bone loss. The recommended treatment guidelines are irrigation, antibiotics, hyperbaric

oxygen therapy, and surgical techniques, including hemimandibulectomy and graft placements.

(Slide 26) Osteoradionecrosis treatment options from dental and nursing teams

Dental Hygiene

- Educate patient to look for signs of osteoradionecrosis
- Refer to a specialist
- Never use ultrasonic instruments on patients that have had history of oral cancer radiation or osteoradionecrosis

Nurse

- Medical therapy in treatment of ORN is primarily supportive, involving nutritional support along with superficial debridement and oral saline irrigation for local wounds.
- Antibiotics are indicated only for definite secondary infection.
- Pentoxifylline has been used for the treatment of radiation-related soft tissue injury with some success. Its use in the treatment of mandibular ORN is unknown, however.

(Slide 27) Xerostomia

- Is a term referring to dry mouth and is a common side effect of cancer treatments
- It is a condition of having not enough saliva or spit to keep the mouth wet
- Occurs from medications, oral infections such as candidiasis, chemotherapy, radiation therapy in area of salivary glands,
- Treatment is easy to perform but complication can arise and any oral changes should be reported to oncologist/oral health team.

(Slide 28) Xerostomia treatment options from dental and nursing teams

- Keep hydrated frequently drinking water helps to loosen up saliva and mucus in mouth and throat
- Rinsing mouth every two hours with water and ½ tsp of salt and ½ tsp of baking soda to 8 ounces of water
- Biotene products such as mouthwashes and chewing gum encouraged proper oral pH of saliva and reduce oral pain. Biotene combines enzyme based protection with soothing mouth moisturizers.
- Oral balance moisturizing dental gel can be applied to the mouth or tongue acting as a moisturizing coat which can promote healing.

- Apply lip moisturizer but not Vaseline, it is an oil base and can promote infection
- Eating pureed foods can help patient with dry mouths;
- eating food that can provide nutrients;
- Appetites decrease and mouth sores can develop making eating painful or difficult.
- Sucking on ice chips or sugar free ice pops can soothe dry mouth discomforts
- Chew sugarless gum stimulates salivary flow
- Sucking on sugar-free candies especially lemon or lime flavors stimulate salivary flow
- Orabase B (OTC) is an adhesive paste with a topical anesthetic (benzocaine) that may be helpful.
- You can also use topical products like Orajel or some prescription products like viscous lidocaine to alleviate discomfort temporarily

Nursing

- Using a cool mist room humidifier at night in the bedroom
- If dehydration is present and dependent on degree of dehydration doctor may prescribe IV fluids and in the case of severe dehydration patient may have to be hospitalized
- If dry mouth is due to infection, antifungals, antibacterial, and antiviral Rx may be required
- GI Cocktail: 1 tbsp. (15mL) Cherry Maalox (acid reducer) + 1 tsp. (5mL) + Nystatin (antifungal) + 1/2 tsp. (2mL) Hurricane Liquid (analgesic) original flavor. Mix ingredients thoroughly. Swish and gargle for one minute, and then swallow immediately before each meal.
- One popular topical agent that appears to get mixed reviews is a so-called “magic mouthwash”. Some patients report good results with a combination of Lidocaine (a numbing agent), Benadryl, Maalox, and Nystatin (an antifungal).

(Slide 29) Radiation Caries

- There are two type of radiation caries defined by their etiology and pathogenesis
 - Direct: teeth lying in the irradiation field
 - Indirect: alterations of the secretion from salivary glands; alteration of the mouth-flora; deficient patient oral hygiene
- Clinically there are four types of radiogenic tooth defects
 - Superficial carious destruction of the necks of the teeth
 - Change of the tooth color to brown black
 - Gradual fuse of the edges and occlusal plane of teeth

- Generalized superficial defects

(Slide 30) Radiation Caries treatment options from dental and nursing teams

Dental Hygiene

- To prevent radiation caries, patients should begin daily fluoride treatment with 2% neutral sodium fluoride gel in prefabricated trays for 5 minutes each day. This practice should continue for life.
- Patient compliance is important however compliance should be monitored and alternate options explored if non-compliance occurs. Ex: fluoride rinses

Nurses

- Watch for changes and refer to oral health team if caries becomes extensive or painful
- Ask patients if they are experiencing tooth pain
- Request dental team to fabricate a mouth guard to be used during head and neck radiation treatments

(Slide 31) When to Provide Dental Treatment

- Blood work must be checked and within 24 hours of dental treatment
- Determine platelet count
- Clotting factor
- Absolute neutrophil count

(Slide 32) When to Postpone Dental Treatment

- White blood cell count (ANC) < 1000 microliter
- Platelet count is < 75,000/mm³ or abnormal clotting factors are present
- Absolute neutrophil count is < 1,000/mm³ (or consider prophylactic antibiotics)

(Slide 33) Pre-Cancer Therapy Dental Treatment

- Brush their teeth gently every three or more times a day with a soft bristle toothbrush, cotton swabs, gauze
- Use mild toothpaste that are non-whitening
- Floss when possible if platelet count is not too low (below 40,000)
- Can use a water pick
- Avoid mouthwashes with alcohol base

- Avoid lemon or glycerin swabs
- Clean dentures and bridges after eating; soak in 1:10 bleach water
- Remove dentures to allow air exposure to tissues, do not wear dentures if mouth sores are severe
- Consider fluoride treatments to help improve the health of their teeth
- Most importantly, patient should keep their oral health and oncology team informed of any changes in their mouth during and after cancer treatment.

(Slide 34) Pre-Cancer Therapy Dental Recommendations

- Prior to beginning cancer therapy, all patients should undergo a thorough dental evaluation, including full mouth radiographs, dental and periodontal diagnosis, and prognosis for each tooth.
- Outline a complete treatment plan, taking into account the patient's motivation and compliance based upon discussions with the patient and his or her family.
- Education patient regarding the need for meticulous oral hygiene and frequent follow-up must be stressed.
- The oral health team should perform prophylaxis, periodontal scaling, caries control, and fabrication of fluoride trays.
- Teeth that cannot be salvaged with conservative endodontic therapy should be extracted.
- Ideally, extractions should be performed 3 weeks prior to beginning cancer therapy.
- Extraction of teeth during cancer therapy should be discouraged and delayed until the completion of treatment with resolution of the oral mucositis.
- Nurses refer to oral health team for comprehensive dental exam

(Slide 35) During Cancer Therapy Dental Treatment

- Fabricated trays filled with 2% Neutral Sodium Fluoride and applied on teeth for 5 minutes daily.
- Toothbrush application of RX strength NaF
- Fluoride OTC

(Slide 36) During Cancer Therapy oral hygiene special needs

- When oral complication occur:
- Sponge toothbrush
- Cotton tip applicators
- Terry cloth

(Slide 37) Oral Rinses

- Chlorhexidine without alcohol
- Saline or salt water rinses
- Magic mouth rinse RX or ½ tsp salt, ½ tsp baking soda, 16 oz. bottled water
- Ice chips
- Gum with xylitol

(Slide 38) Post-Cancer Therapy Dental Treatment

For Periodontal Patients

- 3-4 month hygiene prophylaxis recalls
- Dental exam
- X-rays

Regular Hygiene Patients

- 6 month hygiene prophylaxis
- Dental exam
- X-rays

(Slide 36) MAGPIE instruction

- Discuss and train students on how to use the IPE case-based teaching model MAGPIE.

(Slide 37) Case Study

- Present and administer case study projects.
- Allow 30 minutes for student work.

(Slide 38) Case Study Discussion

- Answer questions and debriefing.

(Slide 39) Post-Survey Instructions**(Slides 40...) References**

Appendix L

Handouts

Mouth rinses for mucositis and xerostomia

- (1 tsp of salt to 4 cups of water; 1 tsp of baking soda in 1 cups of water; ½ tsp of salt and 2 Tbs baking soda in 4 cups of water)
- To help clean oral sores rinsing with mouth rinse 1 part 3% hydrogen peroxide with 2 parts of saltwater
- Rx for Magic Mouth rinse which has lidocaine for pain

Nurse

- Oral debridement with mucolytic agents such as Alkalol which helps dislodge dried secretions
- Oral decontamination, including antibacterial and antifungal rinses
- Topical and systemic pain management such as 2% viscous lidocaine, magic mouthwash preparations, and topical morphine solution: an oral rinse containing doxepin also appears to be effective against pain related to oral mucositis
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- One of the issues of using topical agents is the inability to effectively coat all areas and that the pain relief may be brief. In patients with mucositis who do not achieve pain relief with topical agents, narcotic analgesia is often necessary.

Xerostomia

- Keep hydrated frequently drinking water helps to loosen up saliva and mucus in mouth and throat

- Rinsing mouth every two hours with water and ½ tsp of salt and ½ tsp of baking soda to 8 ounces of water
- Biotene products such as mouthwashes and chewing gum encouraged proper oral pH of saliva and reduce oral pain. Biotene combines enzyme based protection with soothing mouth moisturizers.
- Oral balance moisturizing dental gel can be applied to the mouth or tongue acting as a moisturizing coat which can promote healing.
- Apply lip moisturizer but not Vaseline, it is an oil base and can promote infection
- Eating pureed foods can help patient with dry mouths;
- eating food that can provide nutrients;
- Appetites decrease and mouth sores can develop making eating painful or difficult.
- Sucking on ice chips or sugar free ice pops can soothe dry mouth discomforts
- Chew sugarless gum stimulates salivary flow
- Sucking on sugar-free candies especially lemon or lime flavors stimulate salivary flow
- Orabase B (OTC) is an adhesive paste with a topical anesthetic (benzocaine) that may be helpful.
- You can also use topical products like Orajel or some prescription products like viscous lidocaine to alleviate discomfort temporarily

Nursing

- Using a cool mist room humidifier at night in the bedroom
- If dehydration is present and dependent on degree of dehydration doctor may prescribe IV fluids and in the case of severe dehydration patient may have to be hospitalized
- If dry mouth is due to infection, antifungals, antibacterial, and antiviral Rx may be required
- GI Cocktail: 1 tbsp. (15mL) Cherry Maalox (acid reducer) + 1 tsp. (5mL) + Nystatin (antifungal) + 1/2 tsp. (2mL) Hurricane Liquid (analgesic) original flavor. Mix ingredients thoroughly. Swish and gargle for one minute, and then swallow immediately before each meal.
- One popular topical agent that appears to get mixed reviews is a so-called “magic mouthwash”. Some patients report good results with a combination of Lidocaine (a numbing agent), Benadryl, Maalox, and Nystatin (an antifungal).

Oral Regimen

- Brush your teeth and gums 2 or 3 times a day for 2 to 3 minutes each time. Use a toothbrush with soft bristles.

- When you brush, rinse your brush in hot water every 30 seconds to keep the bristles soft.
- Let your toothbrush air dry between brushings.
- Choose toothpaste with care.
- If toothpaste makes your mouth sore, brush with a solution of 1 teaspoon of salt mixed with 4 cups of water. Pour a small amount into a clean cup to dip your toothbrush into each time you brush. Use toothpaste with fluoride.
- Floss gently 1 time a day. Rinse your mouth 5 or 6 times a day. Use any of these solutions when you rinse:
 - 1 teaspoon of salt in 4 cups of water
 - 1 teaspoon of baking soda in 1 cup (8 ounces) of water
 - One half teaspoon salt and 2 tablespoons baking soda in 4 cups of water
- Avoid rinses that have alcohol in them. You may use an antibacterial rinse 2 - 4 times a day for gum disease. Rinse for 1 - 2 minutes each time.
- Do not eat foods or drinks that have a lot of sugar in them. They may cause tooth decay. Use lip care products to keep your lips from drying out and cracking. Sip water to ease mouth dryness

Dental Health and Cancer Treatment

There are three main ways to treat cancer: removing tumor(s) surgically, killing cancer cells with radiation beams, and killing cancer cells with cytotoxic medications (chemotherapy). Each of these treatment modalities has the potential to cause dental complications and/or can make administering dental care more challenging.

Whenever possible, dental care and patient education should be done before cancer treatment begins. For example, patients who will receive chemotherapy should be taught to use an alcohol-free mouthwash to avoid causing or exacerbating mucositis. Every effort should be made to communicate with the cancer patient's medical team in order to coordinate care. Table 1 is a list of questions that can help improve communication between the dental team and the medical team.

TABLE 1:

What kind of cancer does the patient have, and what is the treatment plan?

If the patient will be undergoing radiation therapy, will the mouth or jaw be in the radiation field?

If the patient will receive chemotherapy, what side effects are expected?

Especially dry mouth, mucositis, neutropenia (low neutrophil count), thrombocytopenia (low platelets), taste changes, etc.

If the patient is already on chemotherapy, when is the best time in the treatment cycle to do a dental procedure? When was the patient's last CBC with differential and how low were the platelets and ANC?

Are there any special precautions that need to be taken or extra treatment(s) that should be given (platelet transfusion, prophylactic antibiotics, etc.) before this patient receives dental treatment?

Will the patient be given a bisphosphonate? Zometa, Aredia, etc

Do you have any additional concerns about the dental health of this patient?

***It is important to understand that blood counts can change significantly in short periods of time, especially in patients who are receiving systemic chemotherapy. When determining whether or not a patient who is receiving cancer treatment is strong enough to receive any kind of medical or dental intervention, it is crucial that the CBC is drawn no more than a day or two before the procedure. There are points in each patient's treatment cycle when the ANC and platelet counts are likely to be the high enough for dental treatment. The patient's medical Oncologist is usually the best person to determine when this "safe" point is.**

Terms to understand:

CBC with Differential: A Complete Blood Count measures white blood cells (WBC), red blood cells (RBC), hemoglobin (Hgb), hematocrit (hct), and platelets. If a differential is ordered, the lab will run additional tests to determine how many of each subtype of white blood cell is present. It gives the number of cells as well as what percentage of the total white blood cell count each subtype represents. A CBC with differential is a vital tool for determining whether or not a patient can safely receive dental treatment. This test gives the healthcare professional a lot of information, but when it comes to safely providing dental care, the most significant parts of a CBC are the platelet count and the white blood cell count/ANC.

WBC: White blood cells are immune cells, and there are five different types: neutrophils, monocytes, lymphocytes, eosinophils, and basophils. Each type of

white blood cell is responsible for protecting the body from infection in a different way. The “differential” portion of a CBC shows how many of each type of white blood cell are circulating in the body. Since neutrophils are the body’s first line of defense, this is the subtype of white blood cell that is most useful in determining whether or not a patient’s immune system is strong enough to protect the body from opportunistic infections. Chemotherapy can drastically reduce a patient’s absolute total neutrophil count (sometimes called an “ANC”), making that patient very susceptible to bacterial, viral, fungal, and even parasitic infections.

ANC: Absolute total neutrophil count. The ANC is part of a CBC’s differential. Neutrophils are the first line of defense against infection, so a low ANC puts patients at increased risk of complications after medical or dental procedures. For most cancer patients, the ANC must meet a predetermined parameter (usually around 1,000/cubic ml) in order to be considered strong enough to receive chemotherapy. Patients being treated for blood cancers such as leukemia and myelodysplastic disorder (MDS) sometimes receive chemotherapy regardless of ANC.

Platelets: Platelets (also called thrombocytes) are cell fragments that are crucial for normal blood clotting. Having too many platelets (thrombocytosis) can result in spontaneous blood clots, and not having enough platelets (thrombocytopenia) can result in life-threatening bleeding. Many types of chemotherapy can lower platelet counts, putting the patient at increased risk of serious bleeding.

NADIR: the point in a patient’s chemotherapy cycle when white blood cell and platelet counts are the lowest. This usually occurs about 7-10 days after the chemo was administered, but can be much later.

*Appendix M***MAGPIE Template**

Evaluate patient's current and potential oral health complications including oral mucositis, oral infections, xerostomia, and potential tooth decay etc. Discuss as a team how you all can help to provide collaborative patient care support for this patient.

MEET the patient to understand their narrative or chief complaint. What is the chief complaint?

Medical	Dental
Ex: diagnosed with osteosarcoma	Ex: Tooth sensitivity

ACCESS using the ICF domains to determine patient's signs and symptoms as it relates to their function ability. The patient has been diagnosed with osteosarcoma and will be going through treatment, determine patient's signs, symptoms current as well as what their future potential needs may be.

Medical	Dental
Ex: mucositis	Ex: Tooth mobility

IMPLEMENT strategies to achieve patient goals.

Medical	Dental
Ex: ask patient each appointment if there are any sores or changes in the mouth	Ex: instruct patient on importance to optimal oral health to prevent oral mucositis

EVALUATE goals using standardized assessments and patient feed-back.

Medical	Dental
Ex: ask patient if they can eat as normally as possible	Ex: facilitate with dentist patient's needs and discuss concerns

*Appendix N***Curriculum Vitae****Shaun Christenson, RDH, BSDH, MSDH**Address: 519 NW 209th Street Ridgefield, WA 98642

Mobile: 360-609-0243

Email: VSHH@aol.com**PROFESSIONAL EXPERIENCES**

- 2014** Presenter at Mount Hood Community College: Interprofessional Education with Dental Hygiene and Nursing Students working with cancer patients' oral health.
- 2013 – Present** Didactic instructor in Dental materials at Mount Hood Community College
- 2013 – Present** Clinical and didactic instructor in Expanded Functions at Mount Hood Community College
- 2013 - Present** Clinical instructor at Mount Hood Community College
- 2013 – Present** Clinical instructor in anesthetic clinic at Mount Hood Community College
- 2013 – Present** Clinical Restorative Lead Instructor in Dental Restorative at Mount Hood Community college.
- 2013** Presenter at Columbia Periodontal Study Club: topic, oral health with cancer patients.
- 2010 - Present** Clinical and Restorative Dental Hygienist: Orchards Dental Vancouver, Washington Dr. Josh Williams
- 1994 – Present** Temporary and part time clinical dental hygiene in Vancouver, Washington with Dr. Tom Erickson, Dr. Brandt Monford, Dr. Bob Nevins, Dr, Gary Ostenson.
- 1983-1992** Dental Assistant with CDA, EFDA

- 1984-1985** Dental Assisting Education at Portland Paramedical School of Dental Assisting
- 1983-1984** Bonnaville Power Administration Student Administration Assistant
- 1983** Graduated from Ridgefield High School on Honor Roll

EDUCATION

- 2014** Masters of Science in Dental Hygiene-Education and Administration: Eastern Washington University
- 2011** Bachelor of Science in Dental Hygiene: Eastern Washington University
- 1994** Associates in Arts and Science Degree: Clark College Dental Hygiene Program
- 1988-1996** Columbia Periodontal Study Club
- 1985** Portland Paramedical Dental Assisting Program Graduate
- 1983** Advanced Business and Accounting high school program graduate
- 1983** High School Graduate: Honor Society Member

PROFESSIONAL DEVELOPMENT

Eastern Washington University Undergraduate Course Work: education, research, leadership (2010/2011)

- Teaching Methods: focusing on Perry's Theory, Barr and Tag study and course design including all areas of lesson planning.
- Research Methods: project related to oral health care protocol for cancer patients.
- Career Strategies exploring career possibilities.

Eastern Washington University Graduate Course Work

Advanced Dental Hygiene Practice with Lab

- Non-surgical advanced Periodontal Instrumentation experience with Periscope working in 8mm periodontal pockets which included use of Peizo Ultrasonic with diamond tips.
- Advanced periodontal instrumentation with periodontal instruments and diamond files.
- Class instruction covering salivary testing for periodontal disease by OralDNA.
- Class instruction summarizing mechanical toothbrushes and their efficacy by Oral B.

- Simulation CPR and medical emergency training using Sime-man including classroom instruction.
- Lecture and presentation covering critical thinking to enhance patient management and care.
- Instruction and clinical experience using Isolite suction and isolation system.
- Instruction and clinical experience using Dental RAT documentation tool.
- At the end of the coarse week, all tools and instruction presented were used.
- Treated periodontal patients with a non-surgical treatment of 8mm pockets using Periscope.

Healthcare Leadership

- Instructional and field work focusing on exceptional leadership theories and skills.
- Community service project delivering free dental treatment to homeless.

Transitional Research, Technical, and Grant Writing

- Research includes all aspect of research design and implementation.
- Grant writing and research technical writing.

Program Development

- Cultural diversity project designing healthcare access to underserved population.
- Program development studies using ADDIE.
- Planned, developed, and implemented program to local dental office providing HIPPA training.

Educational Theory and Teaching Methods

- Study in learning styles, teaching methodology, philosophy.
- Developed lesson plan with learning objectives and rubric.

Advanced Education and Theory

- Study included learning theories, curriculum planning, syllabus development, grading policies, service learning, cultural competencies, and evaluation processes.
- Developed a dental hygiene program.

Clinical Teaching Methods

- Study of clinical education methods, attributes, task analysis, calibration, grading, evaluation, quality assurance, conflict management, and cultural sensitivity.
- Plan, developed, and implemented lesson in sickle scalers to first year students.

Practicum in Application of Teaching Methods and Theories

- Syllabus development and implementation of restorative clinical instruction.
- Evaluated program components and developed improvements in evaluation process of grading.
- Development of evaluation and learning tool including rubrics
- Development of portfolio and reflective learning application for program improvements.

Disease Prevention

- Study included disease management plan, key terms, and application of disease prevention in the health care environment.

1988-1996 Columbia Periodontal Study Club

LICENSES AND CERTIFICATIONS

Washington State Dental Hygiene RDH Licenses	Issued: 1994-current
CPR and Medical Emergency Card	Issued: 8/2013
Western Regional Exam Board Certificate	Issued: 6/1994
Expanded Function Dental Assistant Certification Washington/Oregon	Issued: 3/1985
Certified Dental Assistant Certificate	Issued: 4/1985

COMMUNITY SERVICE

2013 Dental Community Service Project Manager and Leader

1988-present Washington State Extension and 4-H youth development program

- Clark county 4-H General Leader
- Key Project Leader
- Superintendent
- Washington State Project Superintendent

TEACHING EXPERIENCE SERVICE

2013- present Dental Hygiene Instructor Mount Hood Community College

Designed and implemented course syllabus and taught clinical instruction in restorative lab to second year students.

- Dental Materials
- Expanded Function
- Clinical Hygiene
- Anesthetic

2013 Office consultant for HIPPA compliance and training

- 11/2013 Dental Hygiene Instructor Clark College**
Planned and taught didactic and clinical instruction to first year students;
sickle scalers.
- 4/2011 Periodontal Study Club Presenter**
Subject: "Oral protocol for cancer patients prior to, during, and after
cancer treatment." Vancouver, Washington
- 2001-present Home School Teacher, all core subjects from K-8th grade**
Battle Ground Cam/Home link
Washington Virtual Academy
Insight Virtual High School
- 1983-present Religion Instructor**
Church of Jesus Christ of Latter Day Saints

HONORS AND AWARDS

- 2006 Restorative Award of Excellence: Clark College Dental Hygiene**
- 3/1983 Career/Employment Workshop completion**
Certificate of Completion
- 1983 Business Education Course Ridgefield High School**
Certificate of Proficiency
- 1983 National Honor Society Member**
Ridgefield High School